

### Project/Performance Site Location(s)

**Project/Performance Site Primary Location**  I am submitting an application as an individual, and not on behalf of a company, state, local or tribal government, academia, or other type of organization.

Organization Name:

DUNS Number:

\* Street1:

Street2:

\* City:  County:

\* State:

Province:

\* Country:

\* ZIP / Postal Code:

\* Project/ Performance Site Congressional District:

**Project/Performance Site Location 1**  I am submitting an application as an individual, and not on behalf of a company, state, local or tribal government, academia, or other type of organization.

Organization Name:

DUNS Number:

\* Street1:

Street2:

\* City:  County:

\* State:

Province:

\* Country:

\* ZIP / Postal Code:

\* Project/ Performance Site Congressional District:

Application for Federal Assistance SF-424

Version 02

* 1. Type of Submission: <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	* 2. Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	* If Revision, select appropriate letter(s): <input type="text"/> * Other (Specify): <input type="text"/>
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* 3. Date Received: 12/12/2009	4. Applicant Identifier: <input type="text"/>
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5a. Federal Entity Identifier: <input type="text"/>	* 5b. Federal Award Identifier: <input type="text"/>
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State Use Only:

6. Date Received by State: <input type="text"/>	7. State Application Identifier: <input type="text"/>
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8. APPLICANT INFORMATION:

\* a. Legal Name:

* b. Employer/Taxpayer Identification Number (EIN/TIN): 866000256	* c. Organizational DUNS: 1135581620000
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d. Address:

* Street1:	City of Phoenix
Street2:	200 W. Washington Street
* City:	Phoenix
County:	Maricopa
* State:	AZ: Arizona
Province:	<input type="text"/>
* Country:	USA: UNITED STATES
* Zip / Postal Code:	85003-1611

e. Organizational Unit:

Department Name: Public Works Department	Division Name: <input type="text"/>
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f. Name and contact information of person to be contacted on matters involving this application:

Prefix: <input type="text"/>	* First Name: Dimitrios
Middle Name: <input type="text"/>	
* Last Name: Laloudakis	
Suffix: <input type="text"/>	

Title:

Organizational Affiliation:

* Telephone Number: 602-256-5602	Fax Number: 602-534-9864
----------------------------------	--------------------------

\* Email:

**Application for Federal Assistance SF-424**

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**9. Type of Applicant 1: Select Applicant Type:**

C: City or Township Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

\* Other (specify):

**\* 10. Name of Federal Agency:**

Environmental Management Consolidated Business Cen

**11. Catalog of Federal Domestic Assistance Number:**

81.128

CFDA Title:

Energy Efficiency & Conservation Block Grant Program

**\* 12. Funding Opportunity Number:**

DE-FOA-0000148

\* Title:

Recovery Act: Energy Efficiency and Conservation Block Grants: Competitive Solicitation: Retrofit Ramp-up and General Innovation Fund Programs

**13. Competition Identification Number:**

Title:

**14. Areas Affected by Project (Cities, Counties, States, etc.):**

Phoenix, AZ

**\* 15. Descriptive Title of Applicant's Project:**

Energize Phoenix: Transformation through Behavior and Retrofits along the Green Rail Corridor

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

Application for Federal Assistance SF-424

Version 02

16. Congressional Districts Of:

\* a. Applicant

\* b. Program/Project

Attach an additional list of Program/Project Congressional Districts if needed.

17. Proposed Project:

\* a. Start Date:

\* b. End Date:

18. Estimated Funding (\$):

* a. Federal	<input type="text" value="74,654,287.00"/>
* b. Applicant	<input type="text" value="0.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="0.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="74,654,287.00"/>

\* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?

- a. This application was made available to the State under the Executive Order 12372 Process for review on
- b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- c. Program is not covered by E.O. 12372.

\* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes", provide explanation.)

Yes  No

21. \*By signing this application, I certify (1) to the statements contained in the list of certifications\*\* and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances\*\* and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)

\*\* I AGREE

\*\* The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix:  \* First Name:

Middle Name:

\* Last Name:

Suffix:

\* Title:

\* Telephone Number:  Fax Number:

\* Email:

\* Signature of Authorized Representative:  \* Date Signed:

**Application for Federal Assistance SF-424**

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**\* Applicant Federal Debt Delinquency Explanation**

The following field should contain an explanation if the Applicant organization is delinquent on any Federal Debt. Maximum number of characters that can be entered is 4,000. Try and avoid extra spaces and carriage returns to maximize the availability of space.

# PROJECT NARRATIVE

## Section I: Project Objectives

Arizona's largest city (1.6 million residents), largest university (68,000 students), and largest utility company (1.1 million customers), in cooperation with five major banks, propose a practical, yet innovative, energy-efficiency project that will transform the local energy market along a newly created "Green Rail Corridor." Project partners—the City of Phoenix (COP), the Global Institute of Sustainability (GIOS) at Arizona State University (ASU), and Arizona Public Service Company (APS)—have a long history of collaboration on large projects in infrastructure, energy efficiency, and community development. Dimitrios Laloudakis, Energy Manager for COP, will direct the transformative "Energize Phoenix" project. He is a certified energy manager and esteemed among peers for more than 17 years of successfully supervising city departments and working closely with utilities.

The Green Rail Corridor (GRC) is a 10-mile stretch adjacent to the new Phoenix light-rail line; it spans multiple neighborhoods and contains nearly 15,000 housing units and more than 125 million ft<sup>2</sup> of commercial and institutional space. We selected this geography because its residents are demographically diverse (35% are below the poverty level), contains a range of commercial enterprises and public institutions, and has a powerful sense of "new beginning" brought on by public interest in exploring the city by taking the train. Thus, it is the perfect time to instill a sense of pride and branding in this new community's approach to achieving energy efficiency. In short, the GRC will become a readily identifiable, energy-democratizing region bound by a highly visible commitment to energy efficiency.

Our fiscal approach is a game-changer for Arizona and substantially leverages DOE's investment. Five major banks and many businesses and public institutions have agreed to partner with us. These organizations have worked closely many times before and will help sustain the program long after the initial 3 years of project funding. Collectively, these familiar community partners will transform the local energy market, save significant amounts of energy, create thousands of jobs, and sustain an ongoing, brandable effort.

Our program has a long-term vision. Years 1–3 emphasize substantial leveraging of DOE funds, installation of new technology, and a powerful behavioral-change campaign; out-years use our Revolving Loan Fund (RLF) and new revenue streams to continue energy retrofits, capitalize on the momentum of behavioral changes, and institutionalize our financial mechanisms. At the conclusion of our initial 6-year planning horizon, we anticipate:

- reaching electricity savings of 307.4 million kWh/yr;
- \$380M leveraged for use in Years 1–3, \$571M over 6 years;
- retrofitting of 10,500 homes and 90 million ft<sup>2</sup> of office and industrial space;
- average energy reductions of 30% in residences and 18% in commercial buildings;
- 3,800–5,300 jobs created in Years 1–3 and 5,700–8,000 total jobs over 6 years; and
- determining social-marketing techniques that best modify consumer energy use.

We will assess the GRC both quantitatively and qualitatively to document returns on DOE's and other investments and use these assessments to improve the project. Because our project will occur along a multi-use, light-rail line comparable to transportation corridors in many large cities, our lessons learned will be transferrable to cities across the US.

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## Section II: Merit Review Criteria Discussion

### Criterion 1: Leveraging and Sustainability

**Sub-criterion 1.1** – extent to which the proposed activity leverages grant dollars through innovative strategies.

Our strategy is innovative in the broad participation it supports and the partnerships it creates. Significant leveraging will ensure high participation by making available a broad menu of financial mechanisms. Exhibit 1 displays 15 financial tools and strategies designed to create opportunities for participation across the diversity of needs in the GRC. COP, ASU, and APS, together with five banks, local businesses, and a community college district have all identified funds that will be leveraged by our requested \$75M investment in the program. Over the 3-year funding period, \$380M will be leveraged; over the initial 6-year planning horizon, \$571M will be leveraged. This amount includes an out-year revenue stream to ensure sustainability of the effort. These funds support a broad menu of programmatic mechanisms, providing opportunities for participation of multiple audiences living in or traveling through the GRC.

**Sub-criterion 1.2** – extent to which project creates meaningful and sustainable market transformation (especially after grant monies are exhausted).

In our 6-year vision, we will achieve meaningful and sustainable market transformation through a combination of capital-generating financial strategies, utility partnership, and community-oriented initiatives. This approach will make energy efficiency the option of first choice in the GRC and

#### **Phoenix Green-Development Code**

COP currently meets minimum energy conservation standards applicable to commercial structures through compliance with the International Energy Conservation Code (IECC).

The City has already taken steps to build and implement an improved Green Development Code (GDC), consistent with the 2009 IECC, estimated to provide an additional 15% in energy savings. The Code is being instituted over an 18-month period. Compliance will be mandatory in GRC.

**Exhibit 1: Leveraging for Energy Efficiency**

Funds to be Leveraged Over 6 Years: \$571,253,000	Years 1-3	Outyears 4-6
<b>Sum of Leveraging:</b>	<b>\$380,454,600</b>	<b>\$190,798,400</b>
APS Smart Metering Deployment (14,000 smart meters & infrastructure in GRC by Nov 2010)	\$3,223,000	
APS Energy Efficiency Incentives (assume 8% of system wide incentives flow to corridor)	\$6,000,000	\$6,000,000
ASU Sustainable Schools Project (energy efficiency curriculum at Bioscience High)	\$99,600	\$66,400
COP Energy Efficiency Savings for Out-Year Funding (monetary savings from COP conservation projects)		\$600,000
COP Housing Department - Hope VI Project (energy efficiency in GRC public housing - requested)	\$2,000,000	
COP Neighborhood Services Department (WAP funding, in-kind contributions)	\$4,070,000	\$4,070,000
COP Public Works Department (leveraged EECBG Formula Funding)	\$10,000,000	\$10,000,000
COP Workforce Development (in-kind contribution of recruitment and placement)	\$762,000	\$762,000
EECBG Revolving Loan Fund (seed funding by 5 local banks to the RLF)	\$60,000,000	
ESCO-led Financing of Apartment Retrofit (75% financing value of retrofit of 2,500 units) (85% financing value of retrofit of 1,500 units)	\$11,250,000	\$7,650,000
ESCO-led Financing of Commercial Space (75% financing value of retrofit for 60 million sq. ft.) (85% financing value of retrofit for 30 million sq. ft.)	\$225,000,000	\$127,500,000
ESCO-led Financing of Residential Retrofit (75% financing value of retrofit of 2,500 homes) (85% financing value of retrofit of 1,500 homes)	\$18,750,000	\$12,750,000
Gateway Community College (planned energy efficiency infrastructure investments)	\$1,300,000	
Phoenix Residential Solar Program (RLF for installation of solar PV in the GRC)	\$4,000,000	\$4,000,000
Private Investment in ESCO-led Retrofits (landlords, homeowners, businesses invest 10% retrofit cost)	\$34,000,000	\$17,400,000

will achieve the program goal of 50% participation in the GRC in the first 3 years.

To leverage and promote investment, COP will pursue market and regulatory transformation to:

- establish a Revolving Loan Fund (RLF) with 5 banks as a permanent source of capital at competitive interest rates to Energy Service Companies (ESCOs) performing retrofits;
- lower multi-unit sales tax on apartments in the GRC that make energy-efficiency retrofits;
- commit 100% of financial savings from energy-efficiency projects in city buildings and infrastructure to a revenue stream to sustain the project beyond DOE funding; and
- develop a regulatory framework (text box) that accelerates investments in energy efficiency.

Strategic partnerships with APS and ASU will link COP operations, ASU research, and APS energy delivery and measurement. These relationships enable us to:

- spur retrofits by doubling existing APS energy-efficiency incentives during initial funding;
- monitor individual household consumption using new smart meters that APS will deploy in the GRC by November 2010; and
- evaluate and verify participant energy savings and assess the degree to which the financial program transforms the market.

We aim to make energy efficiency a social norm through creative marketing and community involvement. Innovative strategies that create long-term, sustainable behavioral change include:

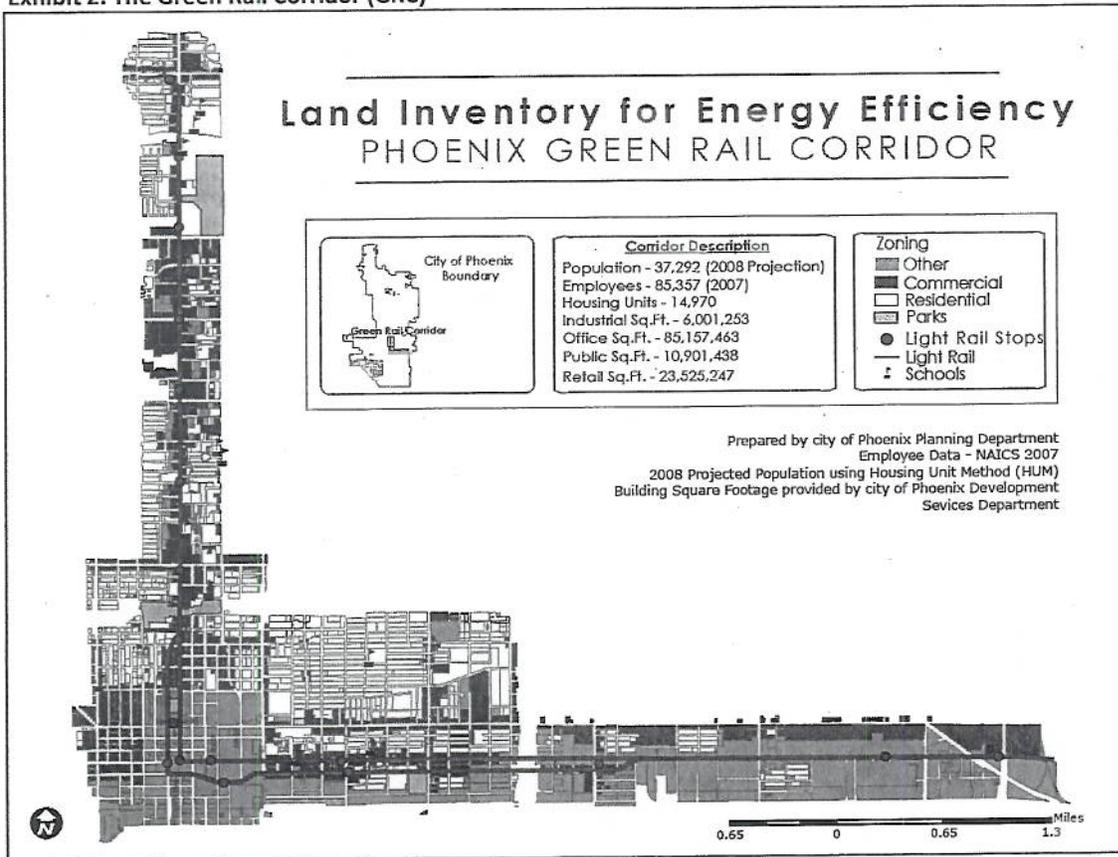
- One-Stop Resource Center in the GRC that sparks project participation by offering information and education on energy efficiency;
- on-site training for the use of energy dashboards installed in residences and small commercial spaces to provide users real-time feedback for energy saving behaviors;
- use of marketing strategies that brand the GRC as an energy-efficient community and encourage behavioral change by appealing to an individual's tendency to conform to social norms consistent with responsible energy use.

## Criterion 2: Project Impact

**Sub-criterion 2.1** – extent to which the project achieves the goal of benefiting from economies of scale and critical mass in a focused building retrofit program, while mitigating risks of increased mortgage defaults or foreclosures.

The GRC (see Exhibit 2) contains 85,000 employees and 37,000 residents; 30,000 light-rail riders pass through the Corridor each weekday.

Exhibit 2: The Green Rail Corridor (GRC)



We will achieve economies of scale and critical mass through:

- focusing on multi-unit residential complexes that comprise over 60% of the housing stock where retrofitting more than a single household yields economies of scale;
- massive deployment of energy dashboards linked to the APS roll-out of smart meters to achieve economies in deployment, data mining, and interpretation;
- a high-touch marketing campaign to change consumer behavior and transform energy consumption; and
- One-Stop Resource Center to directly connect energy-efficiency outreach and retrofit providers with the GRC residents, businesses, and commuters.

Loss of homeowner equity and the risk and reality of foreclosures have impacted Phoenix dramatically. Low-income households are disproportionately represented in the GRC, with 35% of residents living at or below federal poverty level. Programs that reduce energy costs are more impactful on low-income residences, where energy costs constitute a higher percentage of family income. When additional income is made available to families through our program's energy savings, the risk of mortgage defaults and rental eviction will lessen.

**Sub-criterion 2.2** – *expected quantitative impact of energy saved/emissions avoided. Reasonableness of projections of building retrofits (in and out-years) in light of budget and projections of average utility savings.*

**2.2.A. Energy and Utilities Saved**

Only 71 commercial and 141 residential customers in the GRC have taken advantage of annual APS system-wide \$25M energy-efficiency retrofit incentives. **We propose a dramatic increase in participation in existing incentive programs: we will retrofit 50% of commercial and residential space in the GRC over 3 years and our sustained effort in out-years will further advance energy efficiency.** Retrofit and behavioral-modification programs will yield a combined savings of 307.4 million kWh/yr and \$26.2M/yr at the conclusion of the 6-year planning horizon. Exhibit 3 details the quantitative impacts (details and interim energy savings given in Appendix G).

**Exhibit 3. Quantitative Impacts**

Program	Cumulative Number over 6 years	Unit Cost (from grant funding)	Expected Energy Savings (kWh/yr)	Expected Utility Savings* (\$/yr)
Commercial Retrofits <sup>1</sup>	90 million sq. ft.	\$0.20/sq. ft.	270.0 million	\$23.0M
<b>Sub-Total Commercial</b>			<b>270.0 million</b>	<b>\$23.0M</b>
<b>Residential</b>				
Retrofit of owner-occupied homes <sup>2</sup>	4,000	\$1,250/unit	10.3 million	\$0.9M
Expanded weatherization of low-moderate income homes <sup>3</sup>	2,500	\$3,000/unit	5.9 million	\$0.5M
Apartment Retrofits <sup>2</sup>	4,000	\$750/unit	6.2 million	\$0.5M
Home Energy Dashboards <sup>4</sup>	7,500	\$600/unit	15.0 million	\$1.3M
<b>Sub-Total Residential</b>			<b>37.4 million</b>	<b>\$3.2M</b>
<b>Grand Total</b>			<b>307.4 million</b>	<b>\$26.2M</b>

<sup>1</sup>Based on ESCO data. While retrofits under the current APS incentive program have seen annual savings of 1.6 kWh/sq. ft. compared to baseline use of 18.5 kWh/sq. ft. per yr., we will require annual energy savings of 3.0 kWh/sq. ft. from commercial retrofits to qualify for financial incentives from grant funding.  
<sup>2</sup>Based on data from existing APS incentive programs. Savings of 1.3 kWh/sq. ft. per yr. compared to baseline use of 6.9 kWh/sq. ft. per yr. and average home size of 2,000 sq. ft. and apartment size of 1,200 sq. ft.  
<sup>3</sup>Based on data from existing COP Weatherization Assistance Program. Electricity savings of 28% relative to base usage of 8,232 kWh/yr  
<sup>4</sup>Based on data from the HydroOne project (2006). Installation of energy dashboards yielded an immediate savings of 6.5%; when combined with educational tips, consumers saved an additional 7-10%.  
<sup>5</sup>Grant funding only. Excludes leveraged funding and other incentives  
<sup>6</sup>Based on average Arizona electricity costs of 8.5 cents per kWh (data from EIA)

### *2.2.B. Emissions Avoided*

Energy use in Phoenix is electricity-dominated; natural gas accounts for <5% of energy consumption in GRC buildings. Given that Arizona produces 36% of its electricity from coal, 34% from natural gas, 24% from nuclear, and 6% from hydroelectric power, a savings of 307.4 million kWh/yr is expected to reduce CO<sub>2</sub> emissions by 151,000 metric tons/yr.

### *2.2.C. Reasonableness of Projected Retrofit Volume, Budget, and Utility Savings*

Commercial space includes office buildings, public, and institutional space as well as industrial and small commercial buildings. Many GRC buildings are 30+ years old, offering ample opportunities for energy efficiency. The 15,000 housing units in the GRC vary widely in occupancy type and income level: 33% of residences are owner-occupied; 35% of residents are below poverty line; and 61% of residences are in multi-unit complexes. Our project will cover each sector of this market with programs tailored to overcome known obstacles to energy efficiency (see Sub-criteria 3.3).

Allocations reflect program commitments across this broad target audience. The budget will total:

- \$16.7M for building retrofit subsidies
- \$7.5M for weatherization of low-to-moderate income homes
- \$4.5M for installation of energy dashboards

We will highly leverage investments made by the EECBG program, as we estimate average retrofit costs at \$5 per ft<sup>2</sup> (commercial), \$10K per residence, and \$6K per apartment (see Sub-criteria 1.1).

Our plan to retrofit 90 million ft<sup>2</sup> of commercial space and 10,500 homes over a 6-year planning horizon is ambitious, because we seek to create transformative expectations. Our strategy relies on established ESCO infrastructure, financial incentives and access to capital, K-12 outreach, as well as strong branding and viral marketing that stimulates substantial behavioral change. Marketing the financial savings as equal to the annual DOE investment during Years 1–3 will be key to widespread adoption and reaching critical mass in energy efficiency. Through the RLF and revenue from COP energy savings, the permanent transformation to energy-efficiency infrastructure and behavior in Phoenix will continue beyond the 6-year horizon. In addition, we will promote market for technological advances to compound our already-significant savings.

### ***Sub-criterion 2.3 – extent to which the program or project strategy can be adopted or replicated by other communities.***

This project is transferrable because success is not tied to regulatory mechanisms or prolonged federal investments because of the characteristics of the GRC. In particular, it is:

- *Mixed-use.* The project extends across diverse communities and land uses and can be transferred to mixed-use communities that are increasingly common across the US. Energy and cost savings are achieved in multiple building types and for users in multiple demographics (our marketing campaign will target residents, workers, and riders).
- *Electricity-dominated.* Because energy use in Phoenix is electricity-dominated and cooling-driven, energy consumption is easy to monitor and evaluate. Monitoring strategies, including the home-dashboard program, can be transferred to electricity-based systems across the US.
- *Market-based.* Arizona law does not permit Property-Assisted Clean Energy (PACE) programs that have been successful in overcoming barriers to residential renovation in other states. Our financing strategies are nonregulatory, market-based incentives that can be replicated in other regions, independent of legislative barriers.
- *Behavior-driven.* Marketing strategies dependent on media-buys must be sustained with high capital investment. Long-term behavioral strategies embedded in our marketing approach can be transferred and integrated into existing utility marketing campaigns.

### Criterion 3: Project Approach

**Sub-criterion 3.1** – soundness of management strategy, including outreach/marketing strategy, funding structure, implementation/delivery, monitoring-verification plan and strategy for feedback/continuous improvement.

#### **A Collaborative Partnership**

The City of Phoenix has a history of cooperation and success in partnering with APS, the only utility provider in the Corridor, and ASU, which has one of its four campuses (the Downtown Campus) located squarely in the corridor. This strong “city-university-utility” collaboration builds on existing relationships which have included large-scale projects such as the Downtown Bio-Science Campus, Downtown University Campus, Solar City Initiative, and the APS “Solutions for Business” program that incentivizes energy-efficiency projects for the business community. These strong and existing relationships have engendered trust and cooperation among the team members; they are ready to hit the ground running.

#### **3.1.A. Management Strategy**

The vision and work plan for a GRC has grown from a shared commitment among COP, ASU, and APS to develop a green economy, empower communities, and offer a suite of sustainable energy choices to our region (text box). Our city-university-utility collaboration represents a wealth of energy-management experience invested in partner organizations and individuals.

An established regional leader in energy-management, COP has demonstrated an ability to create efficiencies on a large scale by

transforming behaviors and integrating new technologies. Their energy program has evolved to include energy efficiency and technology retrofits, new project design, and staff training for its facilities and operations. The result has been a net savings greater than \$120M. Due to the COP Water Conservation Program, this desert city uses the same amount of water today as it did 20 years ago despite a doubling of population. Water conservation strategies included plumbing retrofits and extensive public-education to successfully create widespread behavioral change.

Phoenix’s Energy Manager, **Dimitrios Laloudakis**, will lead this team of qualified energy professionals to develop a sustainable program that achieves energy savings in the Green Rail Corridor. As a certified energy manager and a certified sustainable technology manager, Laloudakis has the experience working with multiple agencies and the academic, technical, consulting, and utility communities to coordinate and manage this unique team. He currently manages the COP EECSB formula grant (\$15.2M) with similar energy-efficiency strategies targeting city facilities and serves as the chair of the US Green Building Council Central Arizona Governing Council.

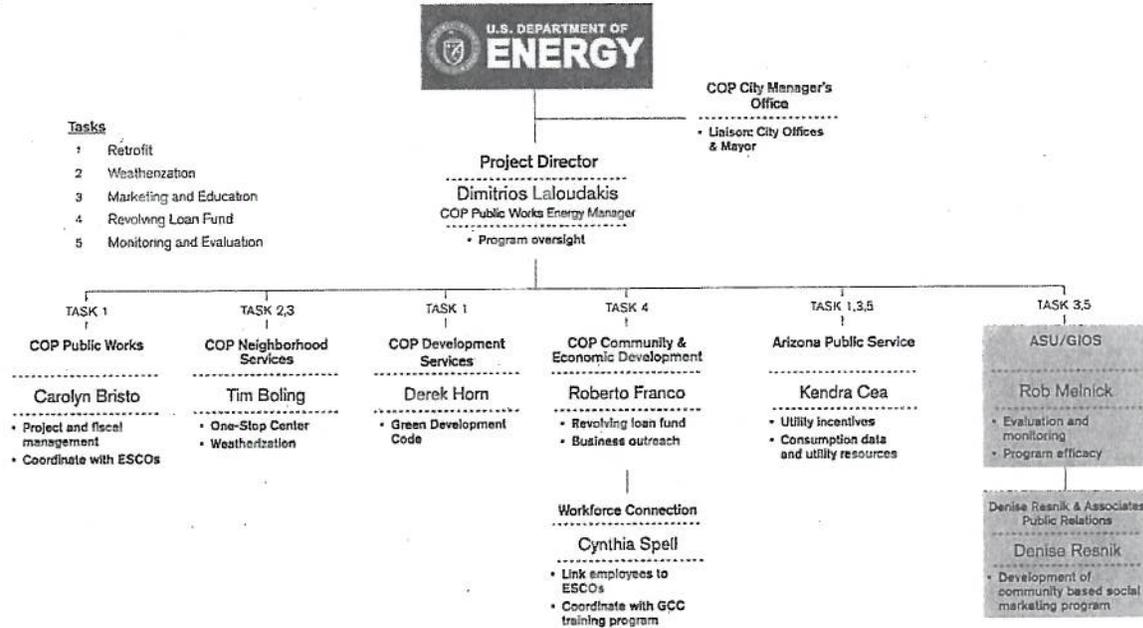
Laloudakis will serve as the main liaison with DOE and ensure that project goals are met efficiently. He will coordinate project activities and external communications with key partners ASU and APS. ASU will develop monitoring and evaluation strategies, conduct reviews of program efficacy, build a community-based social marketing program in conjunction with the marketing firm, and link the program to ongoing K-12 outreach efforts. APS will provide data for energy consumption pre- and post-program, continue existing energy-efficiency incentives, and deploy a smart-metering system in the GRC.

Project Director Laloudakis will immediately convene a project management team representing the partners, participants, and tasks (Exhibit 4) to develop a work plan that details program tasks and deliverables. Based on this work plan, action items will be assigned, regular meetings held to discuss progress, potential obstacles and risks identified, and response strategies developed. Annual reports will be written and submitted to DOE.

He will lead the financial mechanisms, program development, and implementation through COP departments: Public Works, Community and Economic Development, Neighborhood Services, and Development Services. The City will integrate this effort into its existing program strategies and successful service-delivery processes.

- *Department of Public Works (DPW)* will coordinate all GRC partners, program managers, and commercial retrofits. DPW has extensive experience coordinating energy-management projects throughout COP.

**Exhibit 4: Organization of the GRC Program and Leadership Team**



- *Community and Economic Development Department (CED)* will manage financial innovation and investments, serve as the liaison to small and large businesses, and match renovation talent with employment opportunities.
- *Neighborhood Services Department (NSD)* will be the “boots on the ground,” reaching out to GRC residents and small commercial businesses with the One-Stop Resource Center, and will oversee installation of energy-saving infrastructure and monitoring devices. NSD has extensive experience with the existing weatherization program, Community Development Block Grant federal funding, and contractors in residential settings. They engage resident groups, neighborhood associations, and work with schools in collaboration with the COP Education Office.
- *Development Services Department (DSD)* oversees city code which meets current International Energy Conservation Code requirements. DSD will build and implement a Green Development Code and work with NSD to engage the GRC community in revising city policies to encourage higher energy-efficiency standards.

**3.1.B. Behavioral-Change Strategies**

Decisions to save energy on individual, commercial, or institutional scales are replete with economic, social, and psychological components.<sup>1</sup> Our primary partner, ASU/GIOS, in conjunction with marketing partner Denise Resnik & Associates, will use Community Based Social Marketing (CBSM) to instill changes in energy behavior.<sup>2</sup> Our three-phased CBSM campaign will:

- **Educate** target audiences by outlining specific actions that can easily be incorporated into behaviors. For example, “Adjust your thermostat 2 degrees to save 5% on your electric bill” instead of “Use less energy in your home or business.”

<sup>1</sup> Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. Dietz et al., *Proc. Natl. Acad. Sci.*, Volume 106, 18452-18456 (2009).

<sup>2</sup> **Fostering sustainable behavior: An introduction to community-based social marketing.** McKenzie-Mohr, *New Society Publishers* (1999).

- **Encourage** participation by addressing barriers and highlighting benefits of desired behavior.
- Prompt groups to **embrace** desired behaviors by piloting new strategies using an experimental design to measure effects.

We will employ a suite of tactics based upon scientifically tested behavioral and economic principles:<sup>3</sup>

- **Social Norms:** Provide information about what others do or approve to produce marked behavioral change.
- **Loss-Framing:** Link real-time feedback and energy auditing to the psychological predisposition of fearing loss more than anticipating gain.
- **Commitment and Consistency:** Capitalize on an individual's strong need to follow through on promises through immediate program sign-up opportunities and energy-conservation commitment initiatives.
- **Financial Incentives:** Employ zero-cost strategies such as free energy dashboards.
- **Immediate Feedback:** Provide real-time information on cost and energy use, rather than delayed feedback in monthly bills.
- **Authority:** Deliver messages by trusted authorities, as individuals are more likely to follow the lead of an authority.
- **Competition:** Develop fun, interactive competitions to influence conservation behavior.

### 3.1.C. Funding Structure

Our funding goals are fourfold: ensure high participation rates, leverage EECBG grant monies with substantial public and private investments, create measurable cost savings, and continue market transformation of the GRC beyond the funding period. Exhibit 5 details the various ways a diversity of residents and businesses, both large and small, will engage in our energy-efficiency transformation.

#### Financing Commercial Renovations

A funding structure that motivates ESCOs through incentives and access to capital is a proven technique that leverages investment in energy-efficient retrofits. Our commercial program will target ESCOs to work with commercial clients (public, institutional, or industrial) to install highly efficient lighting and variable speed drives (VSDs) on cooling systems and other measures. We will expand the list of ESCOs currently prequalified by the AZ Department of Commerce through a competitive process.

**Exhibit 5: How Residents, Visitors, and Businesses will Engage**

Engagement Menu:	Financing Options (years 1-3)	Financing Options (years 4 and on)
Commercial Retrofits	access to RLF utility incentives ESCO financing grant-funded incentives	access to RLF utility incentives ESCO financing
Owner-Occupied Retrofits	access to RLF utility incentives ESCO financing grant-funded incentives	access to RLF utility incentives ESCO financing
Apartment Retrofits	lowered multi-unit use fees access to RLF utility incentives ESCO financing grant-funded incentives	lowered multi-unit sales taxes access to RLF utility incentives ESCO financing
Weatherization of Low to Moderate Income Homes	grant-funded incentives	to be continued at reduced level under existing WAP program
Residential Behavioral Change	grant-funded installation of energy dashboards	to be evaluated for effectiveness for possible funding in out years
Education of residents and visitors at the One-Stop Center	grant-funded incentives	to be evaluated for effectiveness for possible funding in out years

In Years 1-3, we will coordinate ESCO retrofits with available APS incentives, yielding energy savings that will be monetized to cover all ESCO project costs. The savings would be paid back to the ESCO over the project amortization schedule, after which 100% of the savings will revert to the customer. This highly leveraged funding option, involving limited upfront customer costs, will result in new, energy-efficient equipment being installed and commissioned for a performance period of up

<sup>3</sup> **Yes! 50 scientifically proven ways to be persuasive.** Goldstein et al., *Free Press* (2008); **Influence: Science and practice** (4th edition). Cialdini, *Allyn & Bacon* (2001).

to 20 years (far exceeding the loan amortization schedule), providing the incentive of guaranteed energy savings.

To spur participation in Years 1–3, we will buy-down capital investments for retrofit projects that result in energy-use reductions of at least 3 kWh/ft<sup>2</sup>. The dollar amount of the buy-down will equal twice the existing APS incentives that average \$0.10/ft<sup>2</sup>. This financial incentive will be used to achieve greater energy savings than under the existing utility program. Accelerating retrofits with grant buy-downs will create a marketable message to continue retrofits beyond DOE funding.

Although some ESCOs provide their own capital for renovation projects (i.e. Johnson Controls), for many, access to capital through the revolving loan fund (described below) will accelerate participation. These combined mechanisms will allow participants to retain a portion of the savings after the monthly payment to the ESCO from the initial installation.

#### Financing Residential Retrofits

ESCO-led retrofits will be effective in owner-occupied units where owners have ready-access to capital. For units suitable for ESCO renovation, and to accelerate renovation volumes, we will double APS incentives (currently averaging \$425 for replacement air conditioners; \$200 for duct sealing) with EECBG grant dollars to reach residential retrofits and reach our Year 1–3 target of 2,500 owner-occupied residences. To broaden participation throughout GRC residential stock, we will pursue a mix of financial approaches and incentives.

In addition to doubling APS incentives for apartment retrofits, we lower COP multi-unit privilege license (sales) tax on apartment buildings that undertake ESCO retrofits resulting in reduced annual energy consumption of more than 1.2 kWh/ft<sup>2</sup>. Access to capital through the RLF and tax reduction will motivate apartment owners to retrofit.

<b>ESCO Funding Structure</b>	
Utility Incentives:	5%
Program Buy-Down:	10%
Customer Participation:	10%
<u>Financing (ESCO via RLF)</u>	<u>75%</u>
<b>Total Project Funding:</b>	<b>100%</b>
<i>GRC program will use a mix of funding sources for the initial phase of commercial and residential retrofits.</i>	

#### Revolving Loan Fund

Energy efficiency is often blocked by a lack of access to capital at interest rates that offer reasonable returns on investment and amortization schedules. We will partner with 5 locally operating financial institutions to develop a \$75M RLF focused on GRC energy-efficiency retrofits. Our RLF will provide a source of capital at competitive interest rates to ESCOs and residential contractors. Twelve million dollars of EECBG funding will leverage \$60M in loan commitments from these commercial lenders (\$12M x 5 banks). An additional \$3M from EECBG funds will be used as the reserve for the RLF. We will model this program on the successful “Solar Phoenix” financing operation developed by COP and National Bank of Arizona. In addition, we will leverage the New Market Tax Credit Program that was initiated by COP in 2002 to oversee a commercial real-estate loan fund of \$240M invested in low-to-moderate income census tracts. These loans will be available in the GRC and the established relationship between COP and commercial lenders will be used to expedite RLF development.

By shortening amortization schedules through the RLF, we also expect increased participation for residents who may not plan on staying in a house for more than a few years. The financial institutions that participate in the RLF will underwrite, service, monitor, and collect on the RLF loan pools. As banks spend the same amount of time underwriting small loans as commercial loans, and because residential retrofit loans are substantially less than commercial building loans, access to the RLF with a loan loss backstop will be used to subsidize loans for homeowners so they are affordable for residents and also less risky for banks. We expect a low default rate, as savings from energy efficiency will help repay loans.

### Out-Year Financing

Our ambitious goal requires a sustained effort beyond the 3 years of DOE funding. To this end, and to show commitment to the project, **COP will contribute all savings derived from energy-efficiency retrofits to COP buildings inside the GRC in Years 1–3 to the revenue stream that will sustain the GRC energy-efficiency program in COP through the out-years.** Based on a preliminary analysis of scheduled COP efficiency programs to buildings and street lighting, we expect this revenue stream to reach \$200K/yr. In the summative reports, we will determine the most-effective investments to drive commitments of funding in out-years. As repayments to the RLF are made, capital will be returned to finance energy projects. The partnership between COP, ASU, and APS will be harnessed to pursue additional funding opportunities.

### *3.1.D. Implementation/Delivery Plan*

#### Commercial Retrofit Program

ESCOs are an established, commercial route for energy-efficiency retrofits. Our ESCO partners will provide a turnkey service for energy assessments and audits, project engineering, financing, project implementation, and performance. We will work with ESCOs to expand their scope of strategies to include behavioral programs targeting employee participation (competitions, monitoring, rewards). Barriers that prevent ESCO-driven renovation include access to investment capital (which, for some ESCOs, is the customer's responsibility) and transparency in the energy-savings evaluation after retrofit. We will overcome these barriers through the RLF and ASU's role as an independent evaluator of the efficacy of individual building retrofits. COP Public Works Department will coordinate with local ESCOs on commercial retrofits.

#### Residential Retrofit Program

Our target will be to contact 30,000 GRC residents and visitors through the One-Stop Resource Center, marketing on and off the light rail, and via other communication/education strategies.

*Owner-Occupied Residences.* Our financial incentives will target retrofits of 4,000 retrofits over our 6-year planning horizon. The One-Stop Resource Center will link appropriate residents to ESCOs and double existing utility incentives to buy-down ESCO leveraging during Years 1–3.

*Low-to-Moderate Income Residences.* To reach low-to-moderate income residents, NSD will expand its current Weatherization Assistance Program (WAP), which includes insulation, duct sealing, weather-stripping, caulking, shade screens, and repair of heating/cooling units. Traditionally, WAP has been available to income-eligible, owner-occupied, single-family properties and, on a limited basis, to multi-family properties that house low-to-moderate income tenants. We will expand the program to include additional multi-family properties and transitional housing units owned by nonprofits.

*Apartment Buildings.* Through the multi-unit sales tax rebate, we will advance retrofitting of large apartment complexes, 61% of the housing stock in the GRC. Apartment renovations via ESCOs will use financial capital from the RLF as well as receive the capital buy-down equal to twice the utility incentives. In addition, the EECBG marketing program will develop outreach to eco-conscious consumers. In a competitive market, this differentiation will be a powerful incentive for retrofitting apartments as eco-conscious consumers move to the GRC as a lifestyle choice.

#### Residential Behavioral Program

*Home Energy Dashboards.* In addition to retrofitting and weatherizing, we will fit residences and small commercial users with Home Energy Dashboards that give real-time feedback on energy consumption and associated costs, as well as explain the impact of behavior on energy use. Research has shown that these energy "dashboards" are powerful motivators for reducing energy consumption. Typically, they display real-time power draw (kW), consumption by end use, projected hourly and daily electricity cost, and monthly peak demand. We will install 7,500

feedback devices in participating households and small businesses, enabling them to identify—in real time—the financial repercussions of inefficient energy practices.

*Conservation Consultants.* In addition to the home-improvement aspect of retrofit and weatherization programs, all participating households and small businesses will receive one-on-one consultation with staff certified through the Building Performance Institute. Consultants will review options for retrofits, along with available financing and incentive options. For participants who have had a dashboard installed, consultations will cover the proper use of the dashboard to create energy savings.

*Residential Outreach and Community Involvement.* Working with the marketing team, NSD and One-Stop Resource Center staff will coordinate messaging to commit families to reduce their energy consumption and realize the savings. We will work with nonprofits, neighborhood associations, schools, and small businesses in the GRC. In the case of the schools, NSD will work with ASU's NSF-funded Sustainable Schools program to develop science-based energy inventory curricula for high schools. Outreach to local families will include the development of a "Family Energy Night" to be held at local schools and churches, which will engage children and their parents in learning basic energy concepts, simple energy audits, and using the dashboards. Educational material will be fun, reflect best practices in teaching these topics, and be consistent with AZ Science and Math Standards. We will also connect with the national Youth Build Program that provides youth and young adults who have exited the traditional K-12 system with on-the-job training in construction.

#### *3.1.E. Monitoring/Verification Plan*

ASU/GIOS will take two parallel approaches to monitoring and verifying the energy (electricity) savings and associated costs and CO<sub>2</sub> savings. First, we will monitor participating ESCOs to ensure that they use the latest industry standards as set out in the International Performance Measurement and Verification Protocol (IPMVP)<sup>4</sup>, which are largely based on the technical content of ASHRAE guideline 14.<sup>5</sup> Because of the mix of property types (single/multi-family residential, commercial, industrial, institutional) and the mix of efficiency measures (retrofits, weatherization, behavioral), ESCOs will need to use a number of different protocols to verify participant savings (four different options are suggested in IPMVP). For instance, behavioral savings from installations of only a dashboard cannot be measured by instantaneous electricity consumption comparisons of old and new equipment, but need to be verified by comparison of baseline and post-installation energy consumption, normalized for variations in heating and cooling degree days, occupancy, and hours of operation. We will maintain a property-level database of all ESCO contracts and types of efficiency measures implemented; the cost; the predicted, verified, and projected savings; and the monitoring/verification protocol and analysis approach used.

Second, ASU/GIOS will use the APS customer-billing database to conduct a parallel and independent evaluation of property-level and corridor-level savings. We will compare baseline and post-installation utility bills of affected buildings, as suggested by Option C of the IPMVP document. This statistical analysis will also track participants who fall outside of the ESCO-based analysis because they are participating directly with APS via a non-ESCO DSM program. We will also compare aggregate savings of program participants in the corridor against nonparticipants, and of the corridor as a whole against other areas of the city, so as to statistically identify spillover effects from participants to nonparticipants. The second set of comparisons will also be statistically adjusted for changes in degree-days and vacancy rates, following industry-accepted modeling approaches.

Using these two databases, ASU/GIOS will: compute the average and aggregate savings in kWh, dollars, and carbon emissions; project the savings over the 10-year expected lifetime of equipment;

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<sup>4</sup>Efficiency Valuation Organization (EVO). 2007. *International Performance Measurement and Verification Protocol: Concepts and Options for Determining Energy and Water Savings, Volume 1*. EVO 10000 – 1.2007. April 2007.

<sup>5</sup>ASHRAE, 2002, *Measurement of Energy and Demand Saving, Guideline 14-2002*.

and compare actual savings to those predicted by ESCOs for customers. In addition to reporting these results to DOE, APS, COP, and the ESCOs, we will publicize at light-rail stations the ongoing savings in an easy-to-understand format (see Section 3.1.B.).

The Seidman Research Institute of ASU's WP Carey School of Business will perform econometric and financial analysis to assess the effectiveness of the program options as well as overall cost-effectiveness, including return on investment and payback periods. Evaluation will consider: cost effectiveness of incentives; total costs to participants; debt resulting from participation, if any; customer utility bills; market penetration; and marketing and related expenditures.

### *3.1.F. Strategy for Feedback and Continuous Improvement*

#### Consumer Behavior

In Years 1–3, we will conduct random-sample surveys of residents, workers, and small business owners in the GRC. These surveys will reveal typical energy consumer behaviors and attitudes to allow us to adjust our approaches to behavior change over time. Sampling procedures will consider and stratify for socioeconomic status and size of residential units, square footage, and nature of commercial/institutional enterprises. We will also use experimental designs to test the relative effectiveness of strategies such as the energy-efficient default settings on meters and the use of different types of messages with different segments of our target groups.

#### Program Participation

Key to both pre- and post-project evaluation will be the effectiveness of different techniques to encourage project participation. For commercial and residential consumers, we will explain the potential monetary and non-monetary returns of participating. For example, we will explain that residents in a 2,000 ft<sup>2</sup> property who do not install energy dashboards could lose as much as \$175/yr. Our program's dedicated energy-efficiency consultants will monitor real-time energy savings and feedback provided to dashboards users. As a *quid pro quo* for receiving dashboards, retrofits, and other incentives, residents will allow the project team to record energy use over time and consent to be interviewed about changes in behavior and attitudes.

We consider the light rail to be a "social community" where residents, businesses, and visitors interact. Thus, we will periodically initiate and analyze conversations among riders on the degree to which project participants share their energy-saving information and outcomes with others. We will present energy-efficiency marketing and education measures on the trains themselves, via spontaneous but structured discussions.

Based upon available data, ASU will create an Energy Technology Adoption Model (ETAM) capable of analyzing factors that determine the likelihood of any individual commercial or household energy user adopting an energy-efficient technology. This analysis will provide several valuable outputs including a demand analysis that can hone the targeting of incentives and outreach activities as well as a forecasting tool that can be applied to other regions of COP and aid in the rollout of energy-efficiency programs.

#### Reporting

We will compile monitored/observed data to formulate annual reports and a final report. These three reports will answer the questions: "what worked, what did not, and why?" These "What Works" evaluations will be used to improve the program and refine the transferability of program elements.

***Sub-criterion 3.2*** – *extent to which proposal contains clear goals, well-defined tasks and methods, objective deliverables, and realistic milestones.*

A detailed project timeline is provided in Section III (pg. 17). Here we present the project goals, deliverables, and milestones, based on project tasks and management strategy from Sub-criterion 3.1.

### 3.2.A. Goals, Deliverables, and Milestones

#### Task 1: Retrofit

The goal for the retrofit program is to develop the financial mechanisms, the trained workforce, and the appropriate policies to provide a seamless route for businesses, landlords, and residents. While delivering energy savings of >300 M kWh/yr, we will also deliver a permanent transformation of the approach to energy efficiency, behavior, and retrofit in the GRC. The following year-end, aggregate outcomes will be attained during the course of our program:

- Year 1: unveil incentive program; alter multi-unit sales tax to incentivize apartment retrofits; deploy a Sustainable Energy Recruitment and Training Plan; retrofit 100 commercial buildings, 400 owner-occupied homes, and 400 apartments; install 1,250 home energy dashboards
- Year 2: retrofit on 350 commercial buildings, 1,450 owner-occupied homes, and 1,450 apartments; install 4,400 home energy dashboards
- Year 3: retrofit 600 commercial buildings, 2,500 owner-occupied homes, and 2,500 apartments; install 7,500 home-energy dashboards
- Years 4–6: continue program to complete energy-efficiency retrofits of 900 commercial buildings, 4,000 owner-occupied homes, and 4,000 apartments

#### Task 2: Weatherization

Our goal is to engage the large population of low-to-moderate income residents, providing significant financial savings to those who spend a disproportional fraction of their income on energy. While delivering a decreased risk of foreclosure or rental default, the program will spark energy savings and community integration. Aggregate, year-end outcomes include:

- Year 1: weatherize 400 low-to-moderate income homes
- Year 2: weatherize 1,500 low-to-moderate income homes
- Year 3: weatherize 2,500 low-to-moderate income homes
- Years 4–6: continue weatherization under existing weatherization assistance program

#### Task 3: Marketing and Education

The goal of our marketing and education plan is to build a brandable identity that promotes energy conservation as a social norm in the GRC and makes it a “lighthouse” that affects how other communities in the City behave. It will engage residents, community groups, and businesses in the project through specialized outreach activities, and links to energy-efficiency curriculum materials for K-12 teachers. The deliverables will be a recognizable, community-based, social-marketing program that advances energy efficiency through innovative approaches. Our One-Stop Resource Center will enhance and support these efforts.

- Year 1: open the One-Stop Resource Center; plan and launch community-based social-marketing program; coordinate with existing K-12 outreach efforts at COP and ASU
- Year 2: initiate approaches such as an Energize Phoenix Day, the Energy Star Games, and Stories Sell to highlight financial impacts of energy efficiency in local businesses and homes
- Year 3: transform social norms that govern community perception of energy efficiency to make conservation the approach of first choice; deliver best practices guides based on program evaluation
- Years 4–6: continue to use documented energy savings as strategy for affecting behavioral changes

#### Task 4: Revolving Loan Fund

The goal of the RLF is to provide a reliable source of capital to energy-efficiency retrofits and foster relations between locally operating banks and the ESCO community. The deliverables will be a well-capitalized fund dedicated to energy efficiency retrofits along the GRC that accelerates retrofits of

residential and commercial space, expedited processing procedures to evaluate residential-efficiency loans, and increased focus on efficiency investments.

Year 1: organize and staff the RLF; fund through formal letters of agreement with banks; establish residential and commercial financing policies and guidelines; publicize RLF and aggressively begin funding activities

Year 2: revamp program policies, procedures, and marketing efforts according to feedback

Year 3: establish out-year financing program policies, procedures, and business plans

Years 4–6: retrofit RLF funding and other revenue mechanisms sustained

#### Task 5: Monitoring and Evaluation

Quantitative-data inputs from APS and qualitative-data inputs from on-the-ground program staff will be used to perform econometric and financial analysis of investments and energy savings, evaluate overall program progress and efficacy, and develop tools for predicting energy-efficiency uptake to guide individualized incentives and approaches. Deliverables will include annual assessment reports, datasets that quantify energy savings and effective tools based on analysis of energy efficiency uptake by the community.

Year 1: establish baseline energy-use measures; establish protocols for determining aggregate energy reductions; establish protocols for measuring energy savings by individual building unit; identify preliminary findings and issue briefing paper on “What Works”

Year 2: continue to measure aggregate and building-level energy savings; assess behavioral changes; initiate mid-course corrections; write second “What Works” report

Year 3: continue all qualitative/quantitative measurement; perform second program reassessment and adjust programmatic investments if needed; write comprehensive “What Works” report

Years 4–6: Use “What Works” report, ongoing program infrastructure, and potential philanthropic grants as a basis to transfer responsibility for program evaluation to ASU graduate students to provide them with field experiences and build analytic skills

***Sub-criterion 3.3*** – extent to which institutional, regulatory, or market barriers are identified and includes approaches to overcome.

Traditional barriers will be overcome by reducing risk for borrowers and financial institutions, streamlining city procedures to accelerate retrofit, and creating new incentives for residents, businesses, and institutions. A Rapid Response Team, coordinated by Dimitrios Laloudakis and including participants from COP and major project partners, will be established to address unforeseen barriers and project-related compliance issues.

#### ***3.3.A. Institutional Barriers***

- ***Lack of Access to Information:*** Marketing and community outreach strategies and a community presence in the One-Stop Resource Center will provide participants and passers-through with access to information on energy efficiency.
- ***Lack of Meaningful Community Participation:*** City staff will solicit and incorporate community feedback through grassroots door-to-door efforts (through NSD) and real-estate developers (through CED). Feedback from participants will be incorporated in the drafting of new, streamlined city policies.

#### ***3.3.B. Overcoming Regulatory Barriers***

- ***Lack of Current Green Development Code (GDC):*** COP has already initiated a process to enact a GDC that will change the regulatory framework to spur smart growth and attract capital investment. A supplement to the City’s Energy Code, the GDC would be mandatory in the GRC

and optional in the rest of the city. This code will incentivize retrofit and energy efficiency and should be ready for implementation in 2010.

**3.3.C. Overcoming Market Barriers**

- *Limited Access to Financing:* EECBG-funded RLF reserve enables more secure commercial lending and longer amortization schedules. Savings from the residential retrofit program are used to service debt and reduce homeowner risk.
- *Lack of Landlord Incentive Apartment Renovation:* COP will lower the sales tax for apartment buildings that renovate to reduce annual energy consumption by 1.2 kWh/ft<sup>2</sup> in conjunction with a marketing program targeting eco-conscious renters.
- *Lack of Skilled Energy Auditors and Installers:* Phoenix Workforce Connection (PWC), a division of CED, will deploy a Sustainable Energy Recruitment and Training Plan to build the workforce needed to complete energy-efficiency and retrofit projects. PWC will recruit workers trained in Solar Energy Installation and Energy Audit Training at Gateway Community College, located in the GRC.

**Sub-criterion 3.4** – degree to which application demonstrates a plan to address environmental, health and safety, permitting, and compliance issues, sufficient to support DOE’s review and analysis in accordance with NEPA.

Public Works has developed and implemented an effective internal mechanism to ensure that all its programs meet environmental, health and safety, permitting and compliance issues in accordance with National Environmental Policy Act (NEPA). A similar process is underway in implementing the \$15.2M EECBG formula grant that Phoenix received in September 2009. As the directing department, Public Works will require all project participants to either replicate or improve upon these procedures as a condition for funding. Public Works is ready to share these plans with DOE and provide further information as necessary.

**Criterion 4: Partnership Structure and Capabilities**

**Sub-criterion 4.1** – extent of involvement from a broad range of entities (govt. agencies, private-sector, other organizations).

In addition to the primary partners the following organizations (Exhibit 6) located in the GRC will play important roles: *Valley METRO Rail* (promote Energize Phoenix on the trains themselves), *State of Arizona Energy Office* (link state energy-efficiency to the GRC), and *Maricopa Community College District* (train the retrofit workforce needed to create the GRC). *Other participants* include five banks committed to funding the RLF, Greater Phoenix Chamber of Commerce, Downtown Phoenix Partnership, CB Richard Ellis Group, the Industrial Development Authority, and local sports teams that will create significant visibility for our Energize Phoenix campaign (see Appendix for Letters of support):

**Exhibit 6: GRC Participation Matrix**

Organization	What do we want from them?	What do they want?
Financial Institutions (West Valley National Bank, National Bank of Arizona, Chase, Bank of America, Mutual of Omaha Bank)	-capital for RLF -financing for energy-efficiency projects	-reduced energy costs -access to increased customer base -recognition and visibility
Government Buildings (Maricopa County, State of Arizona, Federal)	-promote energy efficiency retrofits	-reduced energy costs
Public and Educational Institutions (Churches, K12 Schools, Maricopa Community College District)	-participation -community involvement	-reduced energy costs -association with energy efficiency as part of the GRC that caters to eco-conscious consumers
Valley Metro	-use trains to market our program in GRC and beyond	-increased ridership
Residential Neighborhoods (Roosevelt Row, Phoenix Community Alliance)	-participation -promote energy efficiency retrofits	-reduced utility bills and financial savings
Entertainment, Sports, Tourism, and Cultural Venues (Chase Field and the Arizona Diamondbacks, US Airways Center and the Phoenix Suns)	-participation -venues for marketing	-association with energy efficiency as part of the GRC that caters to eco-conscious consumers
Large Employers (Wells Fargo, Arizona Republic, Qwest, Freeport McMoran, SCF Arizona)	-participation -promote energy efficiency retrofits	-reduced energy costs to increase competitiveness

**Sub-criterion 4.2** – extent to which roles and responsibilities of each partner/team member are identified and matched to their ability to manage and implement project.

The primary partners (COP, ASU, and APS) have extensive experience implementing and managing projects of similar size and scale.

**4.2.A. A History of Commitment to Energy Efficiency: City of Phoenix**

COP recently set a goal to become the first carbon-neutral city in the US, but its interest in energy efficiency is long-held. Over 30 years ago, Phoenix established and has run an aggressive Energy Management Program funded by general and enterprise departments that has realized over \$120M in cost avoidance/savings in partnership with the local utilities. The City also adopted Arizona's utility renewable-energy portfolio standard, which calls for 15% of renewable energy generation by 2025. One pathway toward this goal has been weatherization resources and energy-saving retrofits. Dimitrios Laloudakis, Energy Manager for COP, will lead the project.

**4.2.B. Measuring and Monitoring Sustainability Outcomes: ASU's Global Institute of Sustainability**

ASU is the largest university by enrollment in the US and has vast experience in energy-efficiency research and development, measurement, and training. Its faculty and graduate students in the schools of sustainability, engineering, business, architecture and geography are well-trained in monitoring and forecasting techniques associated with energy retrofits in urban settings. ASU practices what it researches, too, having completed the first phase of energy-efficiency upgrades to its utility infrastructure on two campuses, creating and measuring savings of 33 million kWh of electricity by conventional means and averting the release of 32,000 metric tons of CO<sub>2</sub> per year. ASU President Michael Crow was co-initiator of the American College & University Presidents Climate Commitment. The ASU team is led by Rob Melnick, Executive Dean of GIOS. Melnick has 25+ years experience in project management, including federally funded and state-funded programs on environmental and urban issues.

**4.2.C. 100 Years of Energy Data: Arizona Public Service**

APS, the only utility company that supplies electricity in the GRC, will contribute incentive-based consumer and business programs, data on current, actual, and projected energy use, and the knowledge gained through a 100-year history of supplying energy to Phoenix. APS is heavily committed to efficiency programs and has embarked upon a system-wide retrofit to deploy smart meters in their service area and have applied to its regulatory body to increase this to \$50M per year. Furthermore, APS's efforts will be led by Kendra Cea, who has 24+ years experience with APS in program management.

**Sub-criterion 4.3** – ability of project team to complete work successfully, including qualifications/experience of key organizations and personnel.

**4.3.A. City of Phoenix**

Dimitrios Laloudakis, Energy Manager for the city, has led COP energy efforts for 17 years. Laloudakis supervises energy engineers and specialists that consult with City departments on energy management. He chairs the US Green Building Council, Central Arizona Branch, and is a certified energy manager and a certified sustainable technology manager. He works closely with local utility companies, the energy-service industry, and the engineering community. He will be responsible for directing the GRC Project.

**4.3.B. ASU's Global Institute of Sustainability**

Rob Melnick, Executive Dean, will oversee ASU/GIOS research and assessment efforts, as well as coordinate a subcontract with the Denise Resnik & Associates, the program's marketing firm. Before coming to GIOS, Melnick was director of the Morrison Institute for Public Policy for 22 years during which time he worked closely with COP and Arizona's public utilities on issues of urban growth, environmental quality, job creation, and sustainability. Melnick will lead an

interdisciplinary team of economists, urban designers, architects, and engineers whose expertise and roles are delineated in Section V.

#### 4.3.C. Arizona Public Service

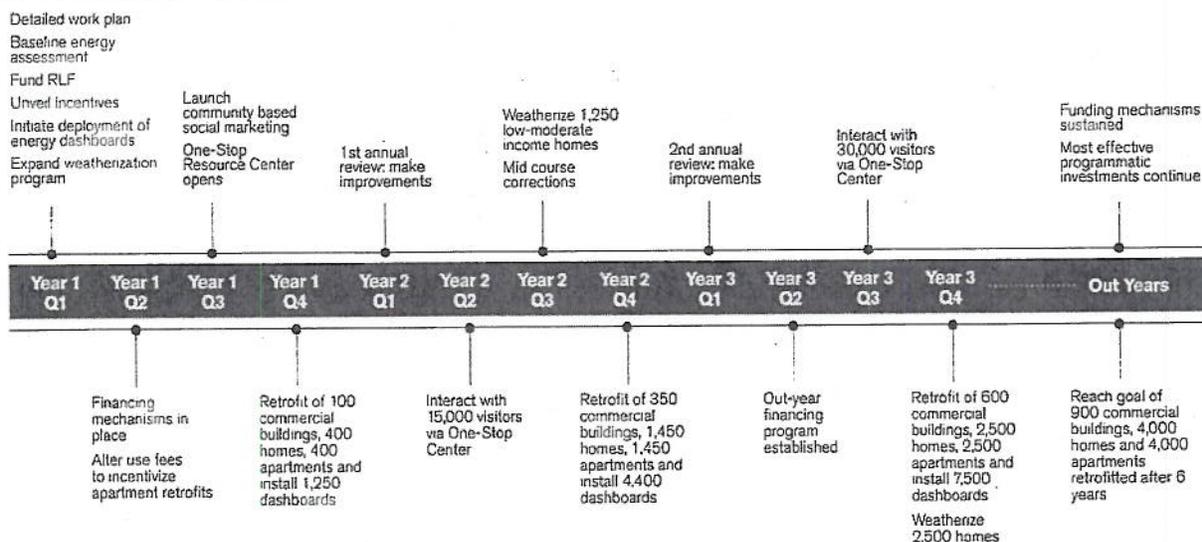
Kendra Cea, Area Manager for APS, brings a wealth of experience in incentivizing energy efficiency through a long history of interaction with major energy users including the COP and ASU. She has established and maintains collaborations with the City of Phoenix, State of Arizona, the federal government, and other “key” account customers.

### Section III: Project Plan and Timetable

Outline as a function of time, year by year, important activities or phases of project, including activities planned in out-years.

Exhibit 7 outlines project activities planned quarterly, by year. Project tasks, goals, deliverables, and milestones are detailed in Sub-criterion 3.2.

#### Exhibit 7. Project Timetable



### Section IV: Relevance and Outcomes/Impact

Relevance of effort to objectives in program announcement and expected outcomes and/or impacts. Justification for project should state importance of project in terms of utility of outcomes and the target community of beneficiaries.

#### Relevance

This project meets EECBG program objectives through a comprehensive program that achieves:

- **Verified energy savings.** We will evaluate and improve home-energy systems through weatherization and installation of energy-efficient systems and appliances. Home-energy dashboards allow users to track their energy use in real-time, thus encouraging changes in behavior. In the case of the larger-scale commercial and institutional participants, ESCOs will work with their clients and ASU to provide transparent verification of energy savings.
- **Broader market participation.** We will enable commercial property in the GRC to access new investment capital and a dedicated financial vehicle (the permanent RLF). COP will partially offset the capital investment with a buy-down program that matches utility incentives during Years 1–3. The One-Stop Resource Center located in the GRC, enhanced access to weatherization programs for low-to-moderate income households, and aggressive marketing activities will offer residents information on energy-efficiency retrofits, and

financing options available to them. Apartment retrofit will be accelerated through lower sales taxes.

- **Leveraging.** Our RLF will be leveraged by banks at a 5:1 ratio. We have identified financial leveraging totaling \$380M over the 3-year DOE project period and \$571M over 6 years.
- **Sustainability.** Repayments for the RLF will roll back into the program, ensuring viability beyond the project period. In addition, COP will contribute the value of savings generated from energy-efficient retrofits in GRC-located COP buildings, street lighting, and other public works back into the EECBG program to ensure a continued revenue stream.
- **An energy-efficient community.** Strategic marketing in and branding of the GRC as an energy-efficient community will reach a large audience and social network of residents, workers, and commuters. Stories of successful energy savers in the GRC will be publically recognized through signage and awards, and communicate social norms for energy-efficient behaviors.
- **Transferability:** The multi-use, multi-neighborhood nature of the GRC and the “What Works” reports will ensure that the project can be replicated in other communities.

### **Outcomes/Importance**

Through innovative incentives, financial products, and grassroots communication, we will reduce the fear of loss associated with investments in retrofit. Through incentives, publicly promoted and demonstrated cost savings, energy efficiency will become the option of first choice in the GRC.

When energy efficiency becomes the social norm, a viral market will develop in the GRC and beyond. People will begin to seek products and services that support energy-efficient behaviors because they will have learned about tangible monetary and social benefits. We will achieve market transformation through creative financing and targeted incentives. **Ultimately, the Green Rail Corridor will create jobs and save over 300 million kWh/yr, translating into savings of over \$26M/yr and reduced CO<sub>2</sub> of 151,000 metric tons/yr.**

### **Section V: Roles of Participants**

*Describe roles and work to be performed by each participant, business agreements between the applicant and participants, and how various efforts will be integrated and managed. Describe experience of each major organization and project directors/managers' experiences performing and implementing similar programs.*

### **Project Management and Experience**

The management experience and expertise of the three principal partners—with Laloudakis, Melnick at ASU/GIOS, and Cea at APS at the helm—is detailed in Sub-criterion 4.3. These individuals comprise the Project's Leadership Team.

### **Project Management and Integration**

Each member of the Project Leadership Team will have discrete responsibilities as well as participate in program review under the direction of Laloudakis. The team will consult regularly with an External Advisory Committee composed of representatives from DOE, a non-involved financial institution, a non-involved ESCO, a neighborhood association, and small- and large-business owners.

### **Participant Roles/Responsibilities; Experience/Expertise**

#### ***City of Phoenix (Dimitrios Laloudakis, Project Director and COP Lead)***

Through its *Department of Public Works*, the City works to reduce energy usage and costs through efficiency, conservation, and awareness programs for the ~5 million ft<sup>2</sup> of facilities. Energy management staff maximize the energy efficiency of 350+ city-owned buildings through upgrading and retrofitting, with an emphasis on efficient lighting and HVAC systems, energy-management

systems, and controls. The Department lead will be Assistant Director **Carolyn Bristo**, with 25+ years of management experience, who oversees sustainability efforts, including transportation, air quality, energy, and green buildings. She is also the sustainability liaison to the City Manager's, Mayor's, and City Council's Offices.

*Community and Economic Development* will manage the investment of program funds to maximize financial leverage as well as oversee workforce development efforts. The Department Lead will be Assistant Director **Roberto Franco**, who has 25+ years experience in private-sector, state, and federal financial and economic-development programs. He also oversees a successful \$240 million Commercial Real Estate New Markets Tax Credits loan fund. As a subgroup of CED, the Phoenix Workforce Connection will coordinate activities to train workers to meet GRC needs. Deputy Director **Cynthia Spell** has 18+ years of experience in workforce and training programs with community-based, faith-based, and other profit/nonprofit organizations.

*Development Services* oversees development and implementation of new development and code requirements. The Department lead will be Assistant Director **Derek Horn**. With 28+ years experience as a consulting engineer, construction-project manager, and administrator, he oversees all the plan review, permitting, and inspection operations.

*Neighborhood Services* will coordinate residential retrofits through local ESCOs, installation of energy dashboards, weatherize low-to-moderate income homes, and establish the One-Stop Resource Center. Deputy Director **Tim Boling** will be the department lead. Boling, with 25+ years COP experience, manages the housing/rental rehabilitation and weatherization programs (\$10M annually); these programs improved 750+ living units last year and will complete 900+ units this year.

*City Manager's Office:* Executive Assistant to the City Manager **Tammy J. Perkins** is the City Manager's point person on sustainability policy and facilitates the integration and interaction between City departments. She has 27+ years of public-management experience in Phoenix including community-development, code-enforcement, neighborhood-redevelopment, and residential programs.

#### **ASU's Global Institute of Sustainability (Rob Melnick, ASU/RIOS Lead)**

RIOS leads and coordinates University activities in sustainability research, education, outreach and business practices. Through its Sustainable Cities Network, it shares knowledge, fosters partnerships, and develops and deploys best practices in small- and large-scale energy systems and the design of sustainable neighborhoods. **Rob Melnick** developed and implemented the strategic plan and budget (\$14M personnel and operations; approximately \$36M-funded research on sustainability university-wide) for RIOS. He oversees faculty and staff and represents ASU to constituents, partners and government agencies. He will guide RIOS to monitor and evaluate energy consumption in the GRC, link the program to social and behavioral change, monitor the overall efficacy of program investments, coordinate with the marketing firm, and provide state-of-the-art training to the conservation consultants. ASU/RIOS will operate as an independent third-party evaluator, producing formative and summative reports on program strengths and weaknesses.

Environmental Engineer **Matt Fraser** has a long history of studying energy impact on air quality and other environmental problems; he will manage ASU's day-to-day involvement. Architect **Harvey Bryan** specializes in building technologies for energy-efficient and renewable energy resources; he has worked extensively with DOE in other projects. Bryan's role will be to develop energy-efficiency training programs and evaluate strategies for energy efficiency in the residential and small commercial sectors. Architect/Engineer **Agami Reddy** studies the demand-side of energy efficiency and conservation in buildings; he will advise on energy consumption and retrofits for commercial and institutional buildings. **Susan Ledlow** is an expert on social influence and environmental decision making; she will coordinate the socio-behavioral and CBSM aspects of the program with the

marketing firm. Urban Geographer **Michael Kuby** specializes in mathematical modeling of energy, transportation, and environmental systems using statistics, GIS, and operations research; he will validate the program's energy savings and emissions reductions. Mechanical Engineer **Pat Phelan** engages in research on heat transfer, energy efficiency, and sustainable-energy systems; he will build the program's energy-consumption model. Economist **Tim James** brings expertise in energy and financial policy, infrastructure, transportation, and economic development; he will supervise data archiving, financial modeling of the data, and evaluation. **Janet Holston**, assistant dean for applied research at ASU's Herberger Institute Research Center, will coordinate academic resources for energy-evaluation and monitoring and consult on data collection and implementation.

ASU/GIOS will subcontract the marketing and communications to **Denise Resnik** of Denise Resnik & Associates. Resnik is a native Phoenician who, in her 26-year career, has played a pivotal role in the inception and implementation of many of the region's leadership organizations including the Greater Phoenix Economic Council. An expert in strategic planning and implementation, she and her firm have worked with many local and national private- and public-sector interests.

#### **Arizona Public Service (Kendra Cea, APS lead)**

Cea will direct APS staff to provide data in energy consumption pre- and post-program, investments in the form of the existing energy-efficiency incentives, implement a smart-metering system in the GRC, and educate residents about how to maximize their energy savings.

#### **Business Agreements**

Partnership agreements are supported by Letters of Commitment (see Appendix).

#### **Section VI: American Recovery and Reinvestment Act (ARRA) of 2009**

*Address how project will promote and enhance ARRA objectives, especially job creation/preservation, and economic recovery in an expeditious manner. Response must include quantitative data supporting the number of jobs created and/or preserved, as well as data supporting other direct economic impacts attributable to project.*

Based on IMPLAN (Impact analysis for PLANning) data for Maricopa County, every \$1M of spending on home renovations results in 5 direct construction jobs and 10 total jobs. Similarly, in commercial construction, every \$1M of renovations results in 7 direct jobs and 14 total jobs. Based upon these figures generated through the Economic Impact Model, total leveraged funds of \$571M from the GRC project will create:

- 3,800–5,300 jobs in first 3 years of the DOE-funded project;
- 5,700–8,000 total jobs in a 6-year period projecting a continued investment in energy-efficient retrofits in out-years.

In addition to jobs created and sustained by investment in retrofit projects, we expect GRC to employ 40 energy auditors and administrative staff in the GRC project offices. We will fill these positions through Phoenix Workforce Connection (PWC), who will recruit and place workers at no additional charge to commercial, industrial, and residential entities in the GRC, and work with students from GRC community colleges to develop a pipeline of qualified workers into the target area. We estimate that at least 30 individuals will be trained per year in Solar Energy Installation and Energy Audits, with a projected achievement of 80% employment and retention rate for those who complete the training. These community-college programs will directly contribute to the education, training, and employment of 90 workers during DOE project years and an additional 210 workers in Years 4–6.

The White House Middle Class Task Force reports that workers at "green" jobs earn 10–20% more than their non green-collar counterparts. As retrofit jobs cannot be outsourced, in-corridor green collar job training and employment services will positively impact employment and income, creating jobs in the energy-efficiency/retrofit industry and stimulating economic growth.

ED PASTOR  
4TH DISTRICT, ARIZONA

COMMITTEE ON APPROPRIATIONS

SUBCOMMITTEE ON  
TRANSPORTATION, HOUSING AND URBAN  
DEVELOPMENT, AND RELATED AGENCIES

SUBCOMMITTEE ON  
ENERGY AND WATER DEVELOPMENT, AND RELATED  
AGENCIES

SUBCOMMITTEE ON  
INTERIOR, ENVIRONMENT, AND RELATED AGENCIES

CHIEF DEPUTY DEMOCRATIC WHIP



Congress of the United States  
House of Representatives

December 9, 2009

PLEASE REPLY TO:

2465 RAYBURN HOUSE OFFICE BUILDING  
WASHINGTON, DC 20515-0304  
(202) 225-4065

411 NORTH CENTRAL AVENUE, SUITE 150  
PHOENIX, AZ 85004  
(602) 256-0551

The Honorable Phil Gordon  
Mayor  
City of Phoenix  
200 West Washington Street, 11th Floor  
Phoenix, Arizona 85003-1611

Dear Mr. Mayor:

I am writing in support of the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. I am proud of the City's long-standing commitment to energy efficiency, resource, and environmental conservation.

It is my understanding that, if funded, the City of Phoenix, along with the Global Institute of Sustainability at Arizona State University and Arizona Public Service Company as partners, will implement a sustainable business model for providing cost-effective energy efficiency upgrades for a range of building types along a ten mile stretch of the Phoenix light rail line, the Green Rail Corridor (GRC). The project goal to retrofit 50 percent of the buildings in the GRC (7,500 residences and 60 million square feet of office, industrial, public, and commercial space) over ten years, for an estimated 120 million kW-hr/year, is ambitious, but I believe achievable.

With committed investments by the three grant application partners, local banks and businesses, and the community college district, the program presented in the grant application will leverage over \$225 million in the first three years for a total of over \$435 million in the ten year horizon. In addition, I understand that financing mechanisms will include a revolving loan fund to provide capital at competitive interest rates to Energy Service Companies that provide energy efficiency retrofits.

By touching half of the buildings in the Green Rail Corridor, the project will benefit an estimated 40,000 employees who work in the Corridor, over 18,000 residents who live in the Corridor, and provide a unique education opportunity to more than 30,000 light rail riders who pass through the Corridor every weekday. I particularly appreciate the alignment of the project to serve the area's at-risk populations through residential weatherization programs.

In my view, this project is valuable to the Nation as the program strategies may be replicated by other communities that are electricity dominated, market based, and behavior driven – generally Sunbelt cities where millions of Americans are choosing to live and work.

It is with sincere enthusiasm that I offer my support for the City of Phoenix's Retrofit Ramp Up grant application.

Sincerely,

Ed Pastor  
Member of Congress

EP/rcp



## City of Phoenix

OFFICE OF THE MAYOR



MAYOR PHIL GORDON

December 12, 2009

Karen Bahan  
Contracting Officer DOE  
Environmental Management Consolidated Business Center, Chiquita Center  
250 East 5<sup>th</sup> Street, Suite 800  
Cincinnati, OH 45202

Dear Ms Bahan:

As Mayor, I am proud and excited to write in support of the City of Phoenix's application to the U.S. Department of Energy for the *Green Rail Corridor Project Retrofit Ramp-Up Program*. With more than 80 environmental, sustainable programs, the City of Phoenix has a long and impressive commitment to protecting the environment. Never to rest our past successes, our dedication to building this community in a sustainable way grows stronger each day.

### Commitment to Energy Conservation

Phoenix has received global recognition and countless awards for our long-standing commitment to energy conservation, energy efficiency and environmental preservation. Phoenix's unique *Energy Conservation Savings Reinvestment Fund* has allowed the Phoenix Energy Office to be on the cutting edge of energy conservation. Through education and community outreach, the City actively participated in national campaigns and grassroots efforts, such as 'ENERGY STAR Change a Light, Change the World', to promote and raise awareness of the benefits of energy-efficient lighting choices.

Following a city policy that encourages construction of 2006 bond-funded City buildings using Leadership in Energy and Environmental Design (LEED) standards, we have realized a steady increase in the number of City-owned green buildings, as well as the number of LEED accredited professionals among City staff. Partnerships with local utilities are strong and have proven beneficial to the development of joint and independent solar photovoltaic (PV) projects -- **including a 100 kilowatt solar system at the new Convention Center.**

### Green Phoenix

The City's *Green Phoenix Plan*, a 17-point initiative designed to make us the first carbon-neutral and most sustainable City in the country, was developed in partnership with Arizona State University. *Green Phoenix* is an ambitious plan that includes weatherizing homes and city buildings, using job training funds to strengthen our "green collar" workforce and, impressively, using large-scale solar installations on 1,400 acres of a City landfill

In addition to the *Green Rail Corridor Project*, the City is moving forward with several ambitious initiatives:

**Phoenix letter**  
**Page two**

- *PHX Sky Train* -- located at Sky Harbor International Airport, the *Sky Train* will take more than 100 buses out of circulation and reduce the number of cars on the roadway -- improving our air quality.
- *Green Phoenix Learning Campus* -- the City of Phoenix has partnered with the largest community college system in the nation -- the Maricopa Community College District to develop the *Green Phoenix Learning Campus* -- a Charter High School that will focus on sustainable jobs, a Green Jobs Training Center, and an Adult Learning Center.
- *Solar Phoenix* -- the nation's largest city-sponsored residential solar program allows the installation of residential solar systems **with no upfront investment** to the homeowner. This results in a monthly solar-lease payment that is lower than their previous electricity bills.

*Track Record of Success*

As the largest City in the country with a **Manager / Council form of government**, we have a strong reputation for being able to deliver on our commitments. Our professional staff members are not subject to the ever-changing political landscape, but remain on staff for long periods of time and are able to gain tremendous experience and knowledge in their field and build strong relationships with the community. Before the recent retirement of our City Manager, Phoenix has had only two City Managers in the past 35 years.

*Green Rail Corridor Project*

Without any doubt, the *Green Rail Corridor Project* will change our view, and the nation's view, of Phoenix. Yet we are not latecomers to the "Sustainable Revolution". In fact, Phoenix uses exactly the same amount of water today as we used 10 years ago -- despite a profound increase in our population (we have grown from the 10<sup>th</sup> largest city in the nation to the 5<sup>th</sup>, in less than 20 years). We did not accomplish this through regulatory changes and mandates, but instead by investing in new technologies and educating one neighborhood, one business, one teacher, one student at a time.

Our commitment to continuing our role as environmental leaders is beyond debate or question. We look forward to working with Arizona State University and Arizona Public Service -- our partners in this transformative initiative -- and achieving the significant and measurable success that can be shared with communities throughout the nation and beyond.

Sincerely,



Phil Gordon  
Mayor

Janice E. Brewer  
Secretary



Donald J. Cardon  
Director

ARIZONA DEPARTMENT  
OF COMMERCE

The center for economic development

December 11, 2009

Mr. Dimitrios Laloudakis  
City of Phoenix  
200 W. Washington St.  
Phoenix, AZ 85003-1611

Dear Dimitrios:

The Arizona Department of Commerce Energy Office is pleased to offer our strong support towards your combined proposal with Arizona State University and Arizona Public Service Company for the "Green Rail Corridor Retrofit Ramp-Up Program". The proposal is being submitted to the U.S. Department of Energy through the EECBG Competitive Grant Program.

Retrofitting existing buildings is recognized as being one of the most cost effective measures to achieve reductions in energy consumption, energy dollar savings, job creation and many environmental benefits. For more than 20 years, the City of Phoenix has had an Energy Management Division that has received numerous awards for improving the energy efficiency of their existing city facilities. The experience gained in managing these energy projects will be a great asset for recommending and assisting with the implementation of projects.

The City of Phoenix is also one of the Energy Office's sub-grantees that administer the Low-Income Weatherization Assistance Program. City staff has completed considerable training in "Building Science" which they use to supervise the home energy audits and inspect completed energy improvements. These are valuable skills for working with the residential sector property owners along the green rail corridor.

We look forward to working with the City and their partners in this effort to have one of the greenest public transit corridor projects in the nation.

Sincerely,

Jim Westberg  
Energy Program Administrator  
Energy Office  
[jimw@azcommerce.com](mailto:jimw@azcommerce.com)  
602-771-1145



*A subsidiary of Phoenix, West Capital Corporation*

**Donald G. Robinson**  
President & Chief Operating Officer

Tel: (602) 250-3392  
Fax: (602) 250-2367  
Donald.Robinson@aps.com

Mail Station 9040  
P.O. Box 53999  
Phoenix, AZ 85072-3999

December 11, 2009

Mayor Phil Gordon  
City of Phoenix  
200 W. Washington St.  
Phoenix AZ 85003

Dear Mayor Gordon,

This letter conveys the support and commitment of APS for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. The City of Phoenix has a long-standing commitment to energy efficiency and resource and environmental conservation. Energy conservation is a vital part of the city's commitment to increase energy efficiency.

APS, Arizona's largest and longest-serving electric utility, provides service to over 1.1 million customers throughout 11 of Arizona's 15 counties. The City of Phoenix and its primary partner, the Global Institute of Sustainability at Arizona State University (ASU), will implement a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial and public buildings along the "Green Light-Rail Corridor." APS will support the city's "Green Rail Corridor Retrofit Ramp-Up Program in the following ways:

- Advanced deployment of APS Automating Metering Information (AMI) "smart meters" throughout the Green Rail Corridor (GRC) – valued at \$3.1 million.
- Marketing of aps.com and the AMI data as a tool for evaluating energy saving opportunities – the energy consumption information that APS customers can access through aps.com's My Account functionality is valued at \$123,000 for the GRC specifically.
- Coordination with the City of Phoenix, ASU and APS customers regarding opportunities to take advantage of existing APS energy-efficiency programs and incentives currently offered to, and paid by APS customers as approved by the Arizona Corporation Commission – incentives and program delivery costs with estimated value of \$2 million annually or a total of \$6 million for the first three years for the GRC specifically.

APS' Demand Side Management (DSM) programs began in late 2005; since then we have been aggressively encouraging customers to reduce energy usage by providing rebates to customers to install more efficient lighting, appliances and other equipment in

Mayor Phil Gordon  
December 11, 2009  
Page 2 of 2

their homes and businesses. APS' DSM programs are an important tool for the city to offer its customers to help them make energy efficiency decisions. APS acknowledges the uncertainty surrounding the estimated energy savings from in-home energy feedback devices and looks forward to the opportunity to review the data gained from the GRC Project as research to clarify the actual energy savings from these devices.

We value this opportunity to support the City of Phoenix and ASU to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,

A handwritten signature in black ink, appearing to read "David U. Bell", with a long horizontal flourish extending to the right.

**ASU**  
ARIZONA STATE UNIVERSITY

December 11, 2009

U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585

To Whom It May Concern:

On behalf of Arizona State University (ASU), I am pleased to confirm our institutional participation and commitment to the transformational proposal that has been put forward by the City of Phoenix, along with Arizona Public Service Company and our university, for consideration by the US Department of Energy's Retrofit Ramp-Up Program.

The proposed project: "Energize Phoenix: Transformation through Behavior and Retrofits along the Green Rail Corridor" is an essential step forward in our shared effort to make Phoenix the first carbon-neutral city in the United States. ASU has collaborated with your offices on plans for "Green Phoenix," which we believe will spark green development and investments in the region, in addition to offering homeowners and businesses access to energy-saving retrofits and other green technologies.

ASU's participation will be coordinated by the Global Institute of Sustainability (GIOS), which is the hub of our research, education, campus operations, and outreach on issues of environmental, social, and economic sustainability. GIOS was created to advance the same manner of sustainable solutions described in DOE's "Green Rail Corridor" proposal.

Our proposed partnership will foster job creation in green industries, lower utility costs, and promote green technologies. In propelling the Greater Phoenix community away from fossil fuels and towards energy efficiency, we will model best practices in the design and operation of transformative energy markets.

ASU strongly supports the Green Rail Corridor proposal and is committed to contributing to its success.

Sincerely,



Michael M. Crow  
President

MMC:rm  
/c

**Office of the President**

Fulton Center 410, 300 E. University Drive  
PO Box 877705 Tempe, AZ 85287-7705  
(480) 965-8972 Fax: (480) 965-0865  
[www.asu.edu/president](http://www.asu.edu/president)



09 December 2009

Rob Melnick  
Executive Dean  
Global Institute of Sustainability/School of Sustainability  
Arizona State University  
PO Box 875401  
Tempe, AZ 85287-5401

Dear Dr. Melnick:

This letter conveys the commitment of Denise Resnik & Associates to the proposal that the City of Phoenix, along with Arizona Public Service Company and Arizona State University (ASU), has put forward to the US Department of Energy's Retrofit Ramp-Up Program.

The proposed project: "Transforming Energy Efficiency and Energy Behaviors in Phoenix: Recovery and Retrofit along a Light Rail Corridor" will implement a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the "Green Light-Rail Corridor."

Denise Resnik & Associates Inc. is a strategic marketing and public relations firm based in Phoenix. Established in 1986, we offer the right combination of strategic thinking, creative insight, marketing expertise and straightforward communications. Our relationships with the media, community opinion leaders and industry influencers run deep and allow us to develop and implement integrated, comprehensive and effective marketing and communications strategies.

As a subcontractor to ASU's Global Institute of Sustainability at Arizona State University, we act as a strategic business partner, from proposal to program completion, lending our relationships, influence, reputation and marketing expertise to help successfully meet the goals of the Green Rail Corridor Retrofit Ramp-Up Program.

We look forward to a successful partnership.

Sincerely,

Denise D. Resnik  
President  
Denise Resnik and Associates

**Denise Resnik & Associates**

717 East Maryland Avenue, Suite 110, Phoenix, AZ 85014  
602 956 8834 main | 602 957 3159 fax | [www.resnikpr.com](http://www.resnikpr.com)

**Bank of America**



Benito C. Almanza  
President - Arizona  
AZ Executive Office

Bank of America  
AZ1-200-24-01  
201 East Washington Street  
Phoenix, AZ 85004-2313

December 10, 2009

Mr. Roberto E. Franco  
Assistant Director Community & Economic Development  
200 West Washington Street, 20th floor  
City of Phoenix  
Phoenix, AZ 85003

Dear Roberto:

On behalf of Bank of America we would like to take this opportunity to applaud the efforts underway in support of the United States Department of Energy's Energy Efficiency and Conservation Block Grant. We recognize the importance of this initiative and are supportive of the application being submitted. We are closely following the progress of the program and anxiously await the outcome. Based on our discussions, the bank anticipates the program to have a meaningful impact on the communities we serve. While the bank is unable to provide a commitment at this time, we will continue to support these types of initiatives and will continue to explore ways to work together in the future.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Benito Almanza', written in a cursive style.

Benito Almanza  
State President - Arizona

# Mutual of Omaha Bank

1450 W. Guadalupe Rd  
Gilbert, AZ 85233  
mutualofomahabank.com

December 5, 2009

Mayor Phil Gordon  
City of Phoenix  
200 West Washington Street 11<sup>th</sup> fl  
Phoenix, AZ 85003-1611

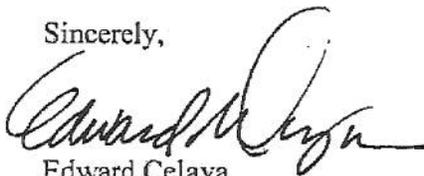
Dear Mayor Gordon:

This letter conveys support for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up program. The City of Phoenix is recognized for its long-standing commitment to energy efficiency as well as resource and environment conservation. Mutual of Omaha Bank is pleased to partner in the ongoing efforts to increase energy efficiency in our community.

As a partner in the Green Rail Corridor Retrofit Ramp-Up program, Mutual of Omaha Bank is pleased to commit up to \$12 million to a \$60 million revolving loan program that will utilize \$15 million of a U.S. Department of Energy grant to credit enhance the loan portfolio. This, of course, would be subject to working out the details to the Revolving Loan Fund including credit criteria, underwriting, collateral issues, pricing and loan servicing issues. This would also be subject to the approval of the Mutual of Omaha Bank's Credit Committee, once details are worked out.

We look forward to partnering with the City of Phoenix to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,



Edward Celaya  
Senior Vice President  
Commercial Real Estate Group



**WEST VALLEY  
NATIONAL BANK**

**Branch Locations:**

12725 W. Indian School Rd., Ste. C-108, Avondale, AZ 85392  
111 E. Monroe Ave., Ste. 100, Buckeye, AZ 85326

**Loan Production Offices:**

14130 W. McDowell Rd., Ste. A-106, Goodyear, AZ 85395  
14500 N. Northsight Blvd., Ste. 217, Scottsdale, AZ 85260

December 1, 2009

Mayor Phil Gordon  
City of Phoenix  
200 West Washington Street 11<sup>th</sup> fl  
Phoenix, AZ 85003-1611

Dear Mayor Gordon:

This letter conveys support for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up program subject to definition of the final guidelines and approval of the program and commitment by West Valley National Bank Board of Directors. The City of Phoenix is recognized for its long-standing commitment to energy efficiency as well as resource and environment conservation. West Valley National Bank is pleased to partner in the ongoing efforts to increase energy efficiency in our community.

As a partner in the Green Rail Corridor Retrofit Ramp-Up program, West Valley National Bank is pleased to commit up to \$12 million to a \$60 million revolving loan program that will utilize \$15 million of a U.S. Department of Energy grant to credit enhance the loan portfolio. This is subject to the legal lending limit of the bank and the definition of the final guidelines and approval of the program and commitment by West Valley National Bank Board of Directors.

We look forward to partnering with the City of Phoenix to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,

Candace Hunter Wiest  
President and CEO  
West Valley National Bank

**THE INDUSTRIAL DEVELOPMENT AUTHORITY  
OF THE CITY OF PHOENIX, ARIZONA**

December 9, 2009

The Honorable Phil Gordon  
Mayor of Phoenix  
City Hall  
Phoenix, AZ 85003-1611

Dear Mayor Gordon:

As the Executive Director of The Industrial Development Authority of the City of Phoenix, Arizona (the "Authority"), I am writing to express the Authority's enthusiastic support for the City of Phoenix's application to the U.S. Department of Energy regarding the Green Light Rail Corridor Retrofit Ramp-Up Program.

The City of Phoenix is well-known for its long-standing commitment to energy efficiency as well as resource and environment conservation. The Authority is pleased to partner with the City of Phoenix in ongoing efforts to increase energy efficiency in our community, such as with the recently established residential solar program (the "Solar Phoenix Program").

The City of Phoenix was instrumental in coordinating efforts by the Authority, National Bank of Arizona ("National Bank"), SolarCity, and Arizona Public Service ("APS") to establish the Solar Phoenix Program. Through this program, National Bank will provide \$25,000,000 to fund the installation of solar panels on approximately 500 to 1,000 single-family residential properties within the City of Phoenix that will provide approximately 2.8 megawatts of solar energy. Additionally, 20% of the program funds will be earmarked for qualified low-income families within the City of Phoenix.

National Bank will own and lease the solar panels to the homeowners, requiring minimal initial payments (just first and last month lease payments upon lease signing) and no other up-front fees. Even after the lease payments, homeowners are expected to save 10%, or more, on electricity bills. As an additional benefit to the homeowners, SolarCity will act as a single point of contact by designing and installing the system in addition to providing maintenance, billing, and other related services.

APS will provide National Bank a flat incentive of \$250 per residential solar system installed in APS service territory and marketing support for the program, in addition to providing SolarCity with renewable energy incentives adopted by the Arizona Corporation Commission. The Authority is collaborating on the program by providing \$250,000 to support a loan loss reserve for the program.

**Board of Directors**

Tom Espinoza  
Raza Development Fund, Inc.  
*President*

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Arizona Dream Realty, LLC  
*1st President*

Lydia Lee  
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Rita Carrillo  
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Donald Keuth  
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Alliance, Inc.  
*Director*

Sal Rivera  
Rivera and Rivera, P.C.  
*Director*

Mark Winkelman  
MGS Realty Partners  
*Director*

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*Executive Director*

Wendy Gutierrez  
*Administrator*

Mike Santellanes  
*Administrator*

**Legal Counsel**

Maria Spelleri  
Lewis & Roca, L.P.

**Accounting Firm**

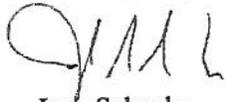
Lynette Wachterhauser  
Karpinski & Jacobsen, PLLC

***THE INDUSTRIAL DEVELOPMENT AUTHORITY  
OF THE CITY OF PHOENIX, ARIZONA***

Other benefits expected to be generated for the City of Phoenix, in addition to the 10% savings on homeowners' electricity bills, include: (1) the creation of 241 direct and indirect jobs with an overall economic impact of approximately \$40 million, and possibly additional, permanent, high-paying jobs in the City of Phoenix; (2) the attraction of new, clean-tech industry to the City of Phoenix that lowers prices, drives innovation, and becomes an additional sales tax generator for the City of Phoenix; (3) support of a renewable energy solution with a positive environmental impact, the equivalent of saving 170 acres of trees, removing 79 million pounds of carbon dioxide from the atmosphere, or removing 100 million car miles from streets and highways; and (4) an expected increase of over 11% in the State of Arizona's megawatts of "grid-tied photovoltaic", or solar, capacity.

We look forward to continuing to partner with the City of Phoenix to promote and implement energy conservation and efficiency. The Green Light Rail Corridor Retrofit Ramp-Up Program is just one more way the City of Phoenix is providing innovative leadership in this area. As such, the Authority strongly supports the City of Phoenix's application to the U.S. Department of Energy for this very important program.

Sincerely,



Juan Salgado  
Executive Director



Greater Phoenix  
Chamber of  
Commerce

December 8, 2009

Phil Gordon, Mayor  
City of Phoenix  
200 W. Washington Street, 11th floor  
Phoenix, AZ 85003-1611

Dear Mayor Gordon:

On behalf of the Greater Phoenix Chamber of Commerce, I am writing to express our support of the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. This program will help Phoenix foster economic prosperity and job creation, while reducing emissions from fossil fuels and putting the city on the pathway to a secure and sustainable energy future.

We back the program because it will provide cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the Green Light-Rail Corridor. Certainly, the efficient movement of travelers is a critical aspect to our commerce and the businesses that depend on the impact tourism adds to our economy. The improvement of the business climate surrounding the Light-Rail system is key to leveraging the area's assets.

We look forward to working with you to ensure the success of the Green Rail Corridor Retrofit Ramp-Up Program and your efforts towards energy independence and conservation.

Respectfully,

A handwritten signature in cursive script that reads "Todd Sanders".

Todd Sanders  
President & CEO  
Greater Phoenix Chamber of Commerce



December 8, 2009

MGS00201

Phil Gordon, Mayor  
City of Phoenix  
200 W. Washington St., 11th Floor  
Phoenix, AZ 85003-1611

The Honorable Mayor Gordon:

This letter conveys the support and commitment of Valley Metro Rail, Inc. (METRO) for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. Like the City of Phoenix, METRO is committed to energy efficiency, resource and environmental conservation. Energy conservation is a vital part of our commitment and ongoing efforts to increase energy efficiency.

METRO is very excited that the focus is on the light rail corridor. We see significant opportunities, both in the surrounding areas and in the light rail stations and park-and-rides. We will work with the City of Phoenix and its primary partners, the Global Institute of Sustainability at Arizona State University and Arizona Public Service Company, to implement a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the "Green Light-Rail Corridor."

As a participating partner in the Green Rail Corridor Retrofit Ramp-Up Program, METRO has already been working with City staff to identify opportunities to reduce our energy usage and improve the efficiency of the light rail system. We have identified opportunities for solar and energy efficient lighting at light rail stations and park-and-rides. We provide transportation for more than one million people a month along the Green Light-Rail Corridor. Our vehicles, stations and park-and-rides are striking, visible opportunities to showcase the City's commitment to energy efficiency and conservation to our diverse passengers, surrounding neighborhoods and businesses, and the traveling public. METRO also provides opportunities for public outreach and marketing.

We look forward to partnering with the City of Phoenix and its primary partners to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,



Richard J. Simonetta  
Chief Executive Officer

c: Ed Zuercher, City Manager's Office  
Maria Hyatt, City Manager's Office  
Document Control File

MGS00201  
File Number: M1 - MANAGEMENT - 4.0.0 - Agency General - Green Light-Rail Corridor



www.maricopa.edu

**Rufus Glasper**  
**Chancellor**

2411 West 14th Street  
Tempe, AZ  
85281 - 6942

**Telephone**

480.731.8100

**Fax**

480.731.8120

**Email**

r.glasper@domail.  
maricopa.edu

December 10, 2009

The Honorable Phil Gordon  
Mayor, City of Phoenix  
200 W. Washington  
Phoenix, Arizona 85003

Dear Mayor Gordon:

This letter conveys the support and commitment of the Maricopa County Community College District (MCCCD) for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. We acknowledge and support the city's long-standing commitment to energy efficiency and resource and environmental conservation. We share the city's commitment to energy conservation and ongoing efforts to increase energy efficiency.

MCCCD would benefit from the results of this grant. A key result – implementation of a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the "Green Light-Rail Corridor" – will provide a model for us to use throughout MCCCD.

As both a participating partner and supporter of the Green Rail Corridor Retrofit Ramp-Up Program, the Maricopa County Community College District is excited to offer this letter of commitment. MCCCD is one of the largest community college districts in the nation serving more than 250,000 students each year. The District is composed of ten colleges, two skill centers, and multiple educational centers and sites across all of Maricopa County. MCCCD is the largest provider of health care workers and job training in Arizona. Four of the ten colleges and one of the skill centers are located in Phoenix. GateWay Community College is located at a stop on the Light-Rail Corridor.

MCCCD has long-standing and productive partnerships with the City of Phoenix and the primary partners for this grant, Arizona State University and Arizona Public Service.

MCCCD is committed to sustainability that involves environmental, economic, and social parameters.

GateWay Community College offers a variety of "green" jobs training programs including one in HVAC (heating, ventilation and air conditioning) and another in solar technology. Job training for energy efficiency and conservation will be located where the residents, businesses and public buildings are located along the Light-Rail Corridor. Education is the key to facilitating behavioral change for residents, workers and visitors, and GateWay Community College will be the catalyst for change in this area.

*A Community of Colleges...Colleges for the Community*

Chandler-Gilbert | Estrella Mountain | GateWay | Glendale | Mesa  
Paradise Valley | Phoenix College | Rio Salado | Scottsdale | South Mountain | Skill Centers

Page 2  
December 10, 2009

Rio Salado College is widely known for its commitment to sustainability. It was recently honored nationally as one of America's Greenest Campuses for having the highest average of carbon reduction per person. The contest was sponsored by Climate Culture and the award was announced on October 14, 2009. Rio Salado College is committed to "green" education through its ongoing work to develop a "Green Learning Campus" in downtown Phoenix. The "Green Learning Campus" will include a Charter High School with a curriculum based on "green" (sustainable) jobs and lifestyle, a green jobs training center, and an Adult Learning Center for individuals seeking basic skills, GED preparation, and English language acquisition. The Adult Learning Center will include "green" features and technology. The Charter High School will open in fall, 2010.

As both participating partners and supporters, the Maricopa Community Colleges will be able to assist the City and its primary partners in leveraging financial resources to achieve widespread adoption and public awareness of energy conservation and the larger concept of sustainability.

We look forward to supporting and partnering with the City of Phoenix and its primary partners to ensure the success of the Green Light-Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,

A handwritten signature in cursive script that reads "Rufus Glasper".

Rufus Glasper, Ph.D., CPA  
Chancellor

# THE ARIZONA REPUBLIC

azcentral.com

December 10, 2009

John Zidich  
President/Publisher  
(602) 444-8162  
(602) 444-8910 fax  
john.zidich@pni.com

Honorable Phil Gordon  
City of Phoenix  
200 W. Washington, 11<sup>th</sup> Floor  
Phoenix, AZ 85003

Dear Mayor Gordon:

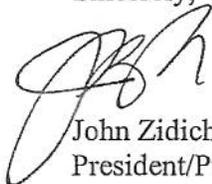
This letter conveys *The Arizona Republic's* support for the City of Phoenix's application to the U.S. Department of Energy for the Green Light-Rail Corridor Retrofit Ramp-Up Program. The City's long-standing commitment to energy efficiency and resource and environmental conservation, along with the Mayor's Green Phoenix initiative, makes Phoenix an ideal recipient of such a grant.

Implementing a voluntary, incentive-based program of this magnitude to improve the energy efficiency of existing residential, commercial and public buildings could be a national model. The impact of serving up to 7,500 homes and 60 million square feet of space in the city's central core has the capability to truly change consumer energy consumption. The highly visible location of the project along Phoenix's well-traveled light-rail system and the City's partnerships with the Global Institute of Sustainability at Arizona State University and Arizona Public Service Company are an added bonus.

As the leading news and information source in Metropolitan Phoenix and the state, *The Arizona Republic's* commitment to sustainability and energy conservation is evidenced by the on-going coverage in our news and editorial pages. As a community leader, we have the responsibility to educate and engage our readers about these critical issues as well as champion public policy changes that will ensure we meet the needs of today while protecting our planet for future generations.

We look forward to reporting on the success of the Green Light Rail Corridor Retrofit Ramp-Up Program.

Sincerely,



John Zidich  
President/Publisher  
The Arizona Republic

COMMERCIAL REAL ESTATE SERVICES

Craig S. Henig  
Sr. Managing Director  
Designated Broker

CB Richard Ellis, Inc.  
Brokerage Services

**CBRE**  
CB RICHARD ELLIS

2415 E. Camelback Rd.  
Phoenix, AZ 85016

602 735 5619 Tel  
602 735 5720 Fax

craig.henig@cbre.com  
www.cbre.com

December 9, 2009

Phil Gordon, Mayor  
City of Phoenix  
200 W. Washington Street  
11th Floor  
Phoenix, AZ 85003-1611

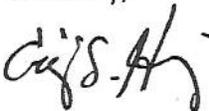
Dear Mayor of Phoenix:

This letter conveys the support and commitment of CB Richard Ellis for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. The City of Phoenix has a long-standing commitment to energy efficiency, resource and environmental conservation. Energy conservation is a vital part of the city's commitment and ongoing efforts to increase energy efficiency.

The City of Phoenix and its primary partners, the Global Institute of Sustainability at Arizona State University and Arizona Public Service Company, will implement a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the "Green Light-Rail Corridor."

We look forward to partnering with the City of Phoenix and its primary partners to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,



Craig S. Henig  
Sr. Managing Director

# DOWNTOWN PHOENIX PARTNERSHIP

December 8, 2009

Honorable Mayor Phil Gordon  
City of Phoenix  
Phoenix City Hall  
200 West Washington Street, 11<sup>th</sup> Floor  
Phoenix, Arizona 85003

Dear Mayor Gordon:

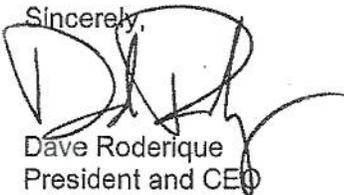
This letter conveys the support and commitment of the Downtown Phoenix Partnership for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. The City of Phoenix has a long-standing commitment to energy efficiency, resource and environmental conservation. Energy conservation is a vital part of the city's commitment and ongoing efforts to increase energy efficiency.

The City of Phoenix and its primary partners, the Global Institute of Sustainability at Arizona State University and Arizona Public Service Company, will implement a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the "Green Light-Rail Corridor."

As a participating partner in the Green Rail Corridor Retrofit Ramp-Up Program the Downtown Phoenix Partnership recognizes the importance of creating an energy efficient downtown core. As the business improvement district which helps revitalize the downtown we work with our developer partners to make sure new construction is not only energy efficient but encourage them to be LEED certified as well. We are working closely with the City of Phoenix and assisted in the funding and re-writing of the downtown plan and zoning code which gives bonus points to developers for sustainability actions such as energy efficiency, enhanced shading and support for an increase in the use of bicycles. Our streetscape improvement districts that we run and have spent hundreds of thousands of dollars on are placing a heavy emphasis on shading to improve the pedestrian experience and encourage light rail ridership.

We look forward to partnering with the City of Phoenix and its primary partners to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,



Dave Roderique  
President and CEO



THE URBAN HEART OF ARIZONA

101 NORTH FIRST AVENUE, SUITE 1450 · PHOENIX, ARIZONA 85003  
TELEPHONE 602 254 8696 · FAX 602 254 8788 · WWW.DOWNTOWNPHOENIX.COM



Foundation for  
Senior Living

1201 E. Thomas Road, Phoenix, AZ 85014  
(602) 285-1800 (602) 285-1838 fax  
www.fsl.org (602) 222-1063 TTY

December 11, 2009

Mayor Phil Gordon  
City of Phoenix  
200 West Washington Street, 11<sup>th</sup> floor  
Phoenix, AZ 85003-1611

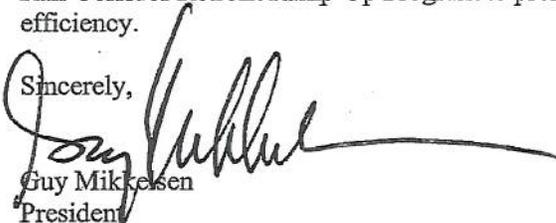
Dear Mayor Gordon:

This letter conveys support for the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up program. The City of Phoenix is recognized for its long-standing commitment to energy efficiency as well as resource and environment conservation. FSL Home Improvements, an affiliate corporation of the Foundation for Senior Living, is pleased to partner in the ongoing efforts to increase energy efficiency in our community. Our organization currently operates the Southwest Building Science Training Center, which is one of twelve sites recognized by the U.S. Department of Energy to perform training and certification on Energy Auditing, Weatherization and Energy Efficiency retrofits. We have been a leader in the industry and have decades of experience providing energy retrofits under the Weatherization Assistance Program. Most importantly, the organization is the designated local sponsor of the Arizona Home Performance with ENERGY STAR program, part of the national EPA Home Performance with ENERGY STAR program. The Home Performance with ENERGY STAR model provides energy efficiency and whole house retrofits in the residential marketplace using qualified contractors.

As a partner in the Green Rail Corridor Retrofit Ramp-Up program, FSL Home Improvements will assist the City with the implementation of the residential energy retrofit component. This will be accomplished by utilizing the already existing Arizona Home Performance with ENERGY STAR program model, qualified contractor pool, and performance standards.

We look forward to partnering with the City of Phoenix to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,

  
Guy Mikkelsen  
President

  
Carrie A. Smith  
Chief of In-Home Services



Sheraton

December 1, 2009

Phil Gordon, Mayor  
City of Phoenix  
200 W. Washington Street, 11th floor  
Phoenix, AZ 85003-1611

Dear Mayor Gordon:

The Sheraton Phoenix Downtown Hotel would like to express its support and commitment to the City of Phoenix's application to the U.S. Department of Energy for the Green Rail Corridor Retrofit Ramp-Up Program. The City of Phoenix has a long-standing commitment to energy efficiency, and resource and environmental conservation. Energy conservation is a vital part of the city's ongoing efforts to increase energy efficiency.

The City of Phoenix and its primary partners, the Global Institute of Sustainability at Arizona State University, and Arizona Public Service Company, will implement a sustainable business model for providing cost-effective energy efficiency upgrades for a large percentage of residential, commercial, and public buildings along the "Green Light-Rail Corridor."

As a supporter of the Green Rail Corridor Retrofit Ramp-Up Program the Sheraton Phoenix Downtown Hotel prides itself on its sustainable efforts. The hotel's Sustainability Committee has already partnered with a local farm for compost that it used in a roof top garden to provide fresh ingredients for the hotel's chefs. And the building's design and construction is reflective of environmentally responsible practices.

We look forward to working with the City of Phoenix and its primary partners to ensure the success of the Green Light Rail Corridor Retrofit Ramp-Up Program to promote and implement energy conservation and efficiency.

Sincerely,

Leo Percopo, General Manager  
Sheraton Phoenix Downtown Hotel

SHERATON PHOENIX DOWNTOWN HOTEL  
340 North 3rd Street  
Phoenix, AZ 85004

t — 602 817 5300  
f — 602 817 5325

[sheraton.com/phoenixdowntown](http://sheraton.com/phoenixdowntown)



Valley Forward Association  
3800 North Central Avenue, Suite 220  
Phoenix, Arizona 85012  
p: 602.240.2408  
f: 602.240.2407  
www.valleyforward.org

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Glen Van Nimwegen

December 9, 2009

The Honorable Phil Gordon  
Mayor  
City of Phoenix  
200 West Washington Street  
Phoenix, Arizona, 85003

Dear Mayor Gordon:

Valley Forward Association strongly supports the City of Phoenix and its project partners – the Global Institute of Sustainability at Arizona State University and Arizona Public Service – in your Green Rail Corridor Retrofit Ramp-Up Program.

Towards that end, we endorse the team's request for funding from the U.S. Department of Energy to implement a sustainable business model for providing cost effective energy efficiency upgrades for residential, commercial and public facilities along the Green Rail Corridor.

Our 40-year-old business-based environmental public interest organization is an historic advocate of light rail transit and sustainable design. This project encompasses both and all of the partners are active, involved members of Valley Forward. All have also been recognized with top honors in our Environmental Excellence Awards program, which for nearly 30 years has set standards for promoting livable communities, conserving natural resources and sustaining our region's unique desert environment for future generations.

This grant provides a unique opportunity for a collaborative effort to reduce energy consumption within the corridor, improve energy efficiency in facilities, and create and retain jobs while stimulating our community's economy.

For these reasons and more, we enthusiastically support the project and urge its funding.

Sincerely,

Diane Brossart  
President



**City of Phoenix**

OFFICE OF THE CITY MANAGER

Phoenix 2009



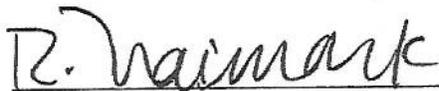
Subject: Required Assurances—DE-FOA-0000148

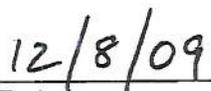
Davis-Bacon Act

This is to certify that all laborers and mechanics on projects funded directly or assisted in whole or in part by and through funding appropriated by the Recovery Act will be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by subchapter IV of Chapter 31 of title 40, United States Code.

Assurances

I hereby designate Neil Mann, Public Works Director, 602-256-5662, [neil.mann@phoenix.gov](mailto:neil.mann@phoenix.gov), as the authorized official to apply for and receive funding based on Title V, Subtitle E, Energy Efficiency and Conservation Block Grants, Sections 541 (3)(B) of IASA 2007, Public Law 110-140.

  
\_\_\_\_\_  
Rick Naimark, Deputy City Manager

  
\_\_\_\_\_  
Date

**Appendix C – NEPA FORM**  
**U.S. DEPARTMENT OF ENERGY**  
**ENVIRONMENTAL SUMMARY**

The Department of Energy (DOE) is required by the National Environmental Policy Act (NEPA) of 1969 as amended (42 U.S.C. 4332(2), 40 CFR parts 1500-1508) and DOE implementing regulations (10CFR 1021) to consider the environmental effects resulting from federal actions, including providing financial assistance. Please provide the following information to facilitate DOE's environmental review.

**PART I: General Information**

**Title:**

Energize Phoenix: Transformation through Behavior and Retrofits along the Green Rail Corridor

**FOA Number:**

DE-FOA-0000148

1. Please describe the intended use of DOE funding in your proposed plan. For example, would the funding be applied to the entire project or only support a phase of the project? Describe the activity as specifically as possible, i.e. planning, feasibility study, design, data analysis, education or outreach activities, construction, capital purchase and/or equipment installation or modification.

DOE funding will provide for cost-effective energy efficient retrofits along a 10-mile stretch of Phoenix's Light Rail Corridor to a large percentage of residential, commercial and industrial buildings. Funds will be applied towards establishing a revolving loan fund, buy-down incentives on ESCO project financing, weatherization of residential structures, monitoring and data analysis as well as marketing, education and outreach. Funding will be applied to the entire project.

2. Does any part of your project require review and/or permitting by any other federal, state, regional, local, environmental, or regulatory agency?       Yes       No

3. Has any review (e.g., NEPA documentation, permits, agency consultations) been completed?       Yes       No  
If yes, is a finding or report available and how can a copy be obtained?

4. Provide information about the potential environmental issues, concerns, and impacts associated with your proposal. Please provide as much detail as possible in the following areas: specifics of proposed activities, project locations, size, layout, commitments to waste

management and historic preservation. If project specific information is unknown, describe your plan for obtaining this information.

This project involves retrofitting residential, commercial and industrial buildings with energy efficient technologies and systems. Weatherization is also a part of the residential component of this project. Using energy service companies (ESCO's), we intend to retrofit 60 million square feet of commercial/industrial space along with 7,500 homes in the Light Rail Corridor. These projects will focus on HVAC, lighting and controls retrofits which comprise the greatest savings opportunity in addition to high efficiency appliances and weatherization for homes in the corridor. Projects involve retrofit of systems within the building structure and no historic preservation impact is anticipated. Any waste generated by retrofit, upgrade and replacement of system components, including packaging for new materials and disposal of old equipment (HVAC units, refrigerators, lamps, etc.) will be recycled or disposed in accordance with local and federal regulations by the chosen vendor.

Principal Investigator  
**Biographical Sketch**  
**Dimitrios J. Laloudakis**

Energy Manager, Public Works Department, Solid Waste Contracts and Education  
City of Phoenix, Barrister Place Bldg, 101 S. Central Ave, Phoenix, AZ 85004  
Phone: (602) 236-3697; Fax: (602) 534-9864; dimitrios.laloudakis@phoenix.gov

---

**Education and Training**

Arizona State University, Tempe, Mechanical Engineering, B.S., 1984  
University of Phoenix, Phoenix, Business Administration, M.B.A., 1997  
Arizona State University, Global Institute of Sustainability, Master Academic Certificate in Sustainable Technology and Management Program, 2007  
Technical Registrations include: State of Arizona EIT No. 04605; Certified Sustainable Development Professional, CSDP No. 0263; Certified Energy Manager, CEM, No. 03979; Certified Demand-Side Manager, CDSM, No 0307.

**Professional Experience**

***Energy Manager, City of Phoenix, Phoenix, AZ***

Mr. Laloudakis plans, organizes and directs the city's energy management program including the development of renewable energy goals and sustainability policy for the Public Works Department, and supervises engineering, technical and administrative staff focusing on project development, planning, implementation, data analysis and reporting. He manages operating and CIP energy project budgets for general fund and enterprise departments. He is also leading efforts for efficient design and construction of city facilities through "green building" practices and LEED program standards. Laloudakis is initiating and managing the Energy Design Assistance program and interfacing with industry engineering professionals in project design, construction, and contract administration. He also interfaces, coordinates and negotiates with utilities on interconnection, rate and contract issues and provides staff support, updates and presentations to the Land Use and Natural Resources Subcommittee, the city manager-appointed Energy Management Task Force (EMTF), and the Environmental Quality Commission (EQC) on renewable energy projects. He participates in utility deregulation forums and rate cases at the Arizona Corporation Commission (ACC), interfacing with power company representatives from Arizona Public Service (APS), Salt River Project (SRP), and Southwest Gas.

Sep 1993-present, Energy Manager, City of Phoenix, Phoenix, AZ

Jan 1992-Apr 1992, Acting Energy Conservation Administrator, City of Phoenix, Phoenix, AZ

Nov 1990-Sep 1993, Energy Management Engineer, City of Phoenix, Phoenix, AZ

**Synergistic Activities**

1. U.S. Green Building Council (USGBC/AZ Chapter), current Board of Directors member
2. Arizona Independent System Administrator (AISA), past Board of Directors member
3. American Society of Mechanical Engineers (ASME)
4. Association of Energy Engineers (AEE), past Treasurer/VP Finance
5. American Society of Heating, Refrigerating & Air Conditioning Engineers (ASHRAE)

Principal Investigator

**Biographical Sketch**

**Rob Melnick**

Executive Dean, Global Institute of Sustainability  
Presidential Professor of Practice, School of Sustainability  
Arizona State University, PO Box 875402, Tempe, AZ 85287-5402  
Phone: (480) 965-2975; Fax: (480) 965-8087; Rob.Melnick@asu.edu

---

**Education and Training**

Dartmouth College, Government, B.A., 1972  
New York University, Political Science, Graduate student, 1972  
Arizona State University, Media, M.A., 1973  
Arizona State University, Educational Technology, Ph.D., 1980

**Professional Experience**

*Executive Dean, Global Institute of Sustainability, Arizona State University*

*Presidential Professor of Practice, School of Sustainability, Arizona State University*

Dr. Melnick has developed and implemented the strategic plan and budget (\$14M personnel and operations; approximately \$36M funded research on sustainability university-wide) for the Global Institute of Sustainability, which leads and coordinates university activities in sustainability research, education, outreach and business practices. He oversees faculty and staff, represents ASU to constituents, partners and government agencies, interacts with ASU's International Board of Trustees for Sustainability. Melnick has authored, managed and contributed to nearly 200 funded policy studies on topics such as economic development, education reform, urban growth, quality of life, workforce development and sustainability. His work has been supported by corporations including American Express, IBM, and Gannett; philanthropic organizations including the PEW Charitable Trust, Ann E. Casey Foundation, Lily Endowment and the Reader's Digest Foundation; and government agencies including the U.S. Department of Housing and Urban Development, U.S. Department of Labor, U.S. Department of Transportation, City of Phoenix, Arizona Legislature, and the Navajo Tribe. He is the principal author of two books - *Urban Growth in Arizona: A Policy Analysis* (Arizona State University) and *Visions of the Future* (International Publishing) and is co-author of *Teaching and Media* (Prentice Hall).

2008-present, Executive Dean, Global Institute of Sustainability, Arizona State University  
2008-present, Presidential Professor of Practice, School of Sustainability, Arizona State University  
2003-2008, Associate Vice President for Economic Affairs and Public Policy, Arizona State University  
2001-2003, Assistant Vice Provost for Research, Arizona State University  
1987-2008, Director, Morrison Institute for Public Policy, Arizona State University  
1987-2008, Research Scientist, Morrison Institute for Public Policy, Arizona State University  
1982-1987, Vice President, Education and Employment Policy Research, Hudson Institute, Inc., Indianapolis, Indiana/Washington, D.C.  
1982-1987, Senior Research Fellow, Hudson Institute, Inc., Indianapolis, IN/Washington, D.C.  
1980-1982, Vice President, Desert Mountain Associates, Inc., Phoenix, AZ  
1975-1980, Associate Director, University Media Systems, Arizona State University  
1975-1980, Instructor, Department of Educational Technology, Arizona State University  
1973-1975, Director, Media Center and Social Studies Teacher, Greenway High School, Glendale High School District, Glendale, AZ

**Synergistic Activities**

1. Principal or co-principal investigator on over \$20,000,000 of policy research projects focusing on the development of urban areas. Examples include: *Greater Phoenix Forward: Sustaining and Enhancing the Human Services Infrastructure* (Valley of the Sun United Way, City of Phoenix, Alcoa Foundation, SRP, APS, ASU College of Public Programs), \$250,000; *Megapolitan: Arizona's Sun Corridor* (Stardust Foundation, Tucson Electric Power, SRP, APS), \$155,000; *The Future of Superstition Vistas* (East Valley Partnership, Central Arizona Project, City of Apache Junction, City of Mesa, Pinal County Board of Supervisors, The Sonoran Institute, Salt River Project), \$200,000.
2. Consultant in the areas of policy analysis, public information, and program evaluation for numerous government, corporate, and educational organizations, including: American Mortgage Bankers Association; Allied Signal; Arizona Supreme Court; Arizona Public Service Corporation; AT&T; *Billboard Magazine*; Charles Schwab; Concor Corporation; Dairy Council of California; Facts on File; Federal Emergency Management Agency; Flinn Foundation; Fordham Foundation; Greater Phoenix Economic Council (GPEC); I.B.M.; Intel Corporation; International Management and Development Group, Indiana Economic Development Council; Miller Research Foundation; National Automotive Dealers Association; Navajo Tribe; public schools in Utah, Arizona, California, New York, Illinois, Connecticut, Michigan, Indiana, North Carolina, and Ohio; Raytheon; Salt River Project; St. Joseph's Hospital Group; Synergistic Educational Systems; the Departments of Education, Economic Security, Radiation Regulation, and Corrections for various states; U.S. Department of Education; University of California System; Valley Partnership; Waltham Foundation.
3. Director: ASU/City of Phoenix Community Outreach Partnership Center," (U.S. Department of Housing and Urban Development, 1996), \$391,042. Grants establishing Community Outreach Partnerships Centers help colleges and universities apply their human, intellectual, and institutional resources to the challenge of revitalizing distressed communities.
4. Board of Directors, TUV-PTL Inc. (solar technologies assessment and accredited certification laboratory).
5. Delivered approximately 100 invited keynote speeches and widely published on issues related to public policy and sustainability, including "Regional roles, relationships and the future of the Phoenix metropolitan area" in D. Phares, ed., *Governing Metropolitan Regions in the 21<sup>st</sup> Century* (2009, with J. Hall); *Arizona Ideas: Policies from A-Z for a Livable and Competitive State.*" Morrison Institute for Public Policy, Tempe, AZ (2006, with R. Todd, G. Gammage Jr., N. Welch, D. Berman, B. Hart, R. Heffernon, and E. Rosenberg); *The Economics of Large-Scale Conservation: A Framework for Assessment in Pima County*" Morrison Institute for Public Policy, Tempe, AZ (2002, with M. Muro and J. Onaka); *Setting the Pace: A Workforce Development Guide for Chambers of Commerce*" U.S. Chamber of Commerce, Washington, DC (1998, with J. A. Vandegrift and A. Danzig); and *The Modern Red Schoolhouse: Technology Planning and Implementation Handbook*" Hudson Institute, Indianapolis (1995, with L. Beirlein).

## Biographical Sketch

### Timothy C. Boling

Deputy Director, Neighborhood Services Department  
Phoenix City Hall, 4<sup>th</sup> Fl., 200 W. Washington St, Phoenix, AZ 85003  
Phone: (602) 534-1555; tim.boling@phoenix.gov

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#### Education and Training

University of Phoenix, Business Administration, B.S.

Participated in City of Phoenix-sponsored training and development activities, including:

University of Arizona Institute for Local Government, Public Policy, Oct 2003

Civil Treatment, Jul 2002

Management Academy, Jun 2001

Media 101, May 1996

Citizen Police Academy, Nov 1995

#### Professional Experience

##### ***Deputy Director, Neighborhood Services Department, City of Phoenix, AZ***

As Deputy Director, Mr. Boling, oversees an annual budget of \$12M and leads a staff of 55. He plans, develops, coordinates and implements neighborhood revitalization programs and services including housing rehabilitation, lead hazard control, citywide graffiti abatement, capital improvement planning and education. Boling prepares and presents operational reports and recommendations for action to City Council and facilitates neighborhood-based problem-solving sessions including traffic mitigation, blight elimination, environmental, and planning and zoning issues. He develops and expands neighborhood working partnerships and neighborhood leadership coalition building and coordinates seamless service delivery to neighborhood and business constituents among other City departments. He also leads divisional and departmental teams to advance neighborhood revitalization programs such as *Fight Back*, *Rental Renaissance*, *Weed and Seed*, and *Neighborhood Initiative Areas*.

May 1999-present, Deputy Director, Neighborhood Services Department, City of Phoenix, AZ

Mar 1998-May 1999, Neighborhood Coordination Supervisor, Neighborhood Services Department, City of Phoenix, AZ

Aug 1995-Mar 1998, Lead Neighborhood Specialist, Neighborhood Services Department, City of Phoenix, AZ

Feb 1994-Aug 1995, Neighborhood Specialist, Neighborhood Services Department, City of Phoenix, AZ

Oct 1988-Feb 1994, Neighborhood Maintenance and Zoning Enforcement Specialist II, Neighborhood Services Department, City of Phoenix, AZ

Aug 1986-Oct 1988, Neighborhood Maintenance and Zoning Enforcement Specialist I, Neighborhood Services Department, City of Phoenix, AZ

Sep 1984-Aug 1986, Survey Aide, Engineering Department, City of Phoenix, AZ

#### Synergistic Activities

1. 2004-present, Board Member, ex-officio, Maryvale Revitalization Corporation
2. 1999-2006, Member, Capitol Mall Association Advisory Board
3. 1998-2000, Member, Board of Management, Desert Sky YMCA Extension
4. 1996-1998, Member, Board of Management, Christown YMCA

## **Biographical Sketch**

### **Carolyn F. Bristo**

Acting Public Works Director, City of Phoenix

Assistant Public Works Director, Support Services, City of Phoenix

Public Works Department, Barister Place Bldg, 3<sup>rd</sup> Fl., 101 S. Central Ave, Phoenix, AZ 85004

Phone: (602) 534-1766; carolyn\_bristo@phoenix.gov

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### **Education and Training**

Southern University, Baton Rouge, LA, Biology Education, B.S., 1981

Trinity University, San Antonio, TX, Urban Studies, M.S., 1983

### **Professional Experience**

*Acting Public Works Director, City of Phoenix*

*Assistant Public Works Director, Support Services, City of Phoenix*

As Acting Public Works Director, Ms. Bristo provides the highest quality of timely, cost-effective, diversity and environmentally sensitive management of solid waste, equipment, facilities and energy programs. Her management of all department functions include solid waste collection, disposal, recycling, facilities management, fleet management, public-private managed competition, energy management and administrative functions. She manages an operating budget of over \$240M, a 5-yr capital improvement budget of over \$177M and over 1,000 employees. As Assistant Public Works Director for Support Services, Ms. Bristo manages all support services functions, including facilities management, energy management, sustainability initiatives, the Citywide Security and Access Review Team, fleet management, citywide vehicle replacement program and administrative services including budget, information services, contracts and environmental services. In Support Services, she manages an operating budget of over \$112M, a 5-yr capital improvement budget totaling over \$65M and over 500 employees.

2008-2009 (5 mos), 2007-2008 (5 mos), 2005 (2 mos), Acting Public Works Director, City of Phoenix (rotating assignment)

2005-present, Dec 1999-Aug 2001, Assistant Public Works Director, Support Services, City of Phoenix

Aug 2001-Oct 2005, Assistant Public Works Director, Solid Waste Services, City of Phoenix

Nov 1995-Dec 1999, Economic Development Administrator, City of Phoenix

Nov 1994-Nov 1995, Deputy Human Services Director, City of Phoenix

Apr 1991-Oct 1994, Assistant to Deputy City Managers, City of Phoenix Manager's Office

### **Synergistic Activities**

1. Co-chair of the Citywide Security and Access Review Team responsible for citywide development, training, implementation and oversight of new City regulations, procedures, and protocols for badging and background checks for City employees and contract workers. Public Works has the lead responsibility for the City's general badging office and alarm services, badging over 75% of the City's 13,000 employees and contractors and monitoring over 562 alarm accounts.
2. Led Public Works Team, working on City's Environmental Quality Commission and Office of Environmental Programs, to establish the City's first renewable energy goal of 15% by 2025. Public Works.
3. Oversaw project management team responsible for construction of the new state-of-the-art North Gateway Transfer Station, a 180,000 sq. ft., \$51M solid waste transfer and recycling facility, serving the northern half of the 500 sq. mi. City. The facility was staffed, equipped, and

**Page 2 – Biographical Sketch – Carolyn F. Bristo**

opened ahead of schedule and on budget. The facility accepted approximately 205,000 tons of solid waste in its first six months.

4. Established a broad-based, employee-driven team to enhance solid waste customer service, and led the oversight and implementation of those enhancements. In the next annual citywide residential customer satisfaction survey, Phoenix residents rated solid waste collection services an 8 of 10, the highest rating ever received by Public Works and it was only exceeded in rating by the Fire Department.
5. Member of the National Forum for Black Public Administrators, the Public Technology Institute Sustainability Roundtable, and the Arizona City Management Association.

## Biographical Sketch

### Harvey J. Bryan

Professor, School of Architecture and Landscape Architecture  
Affiliated Faculty, School of Sustainability  
Arizona State University, PO Box 871605, Tempe, AZ 85287-1605  
Phone: (480) 965-6094; harvey.bryan@asu.edu

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#### Education and Training

Arizona State University, Architecture, B.Arch., 1973  
University of California, Architecture, M.Arch., 1974  
University of California, Energy and Resources, M.S., 1980  
University of California, Architecture, Ph.D., 1987

#### Professional Experience

*Professor, School of Architecture and Landscape Architecture, Arizona State University*  
*Affiliated Faculty, School of Sustainability, Arizona State University*

Dr. Bryan is a specialist in building technology who has written over 100 papers and articles, many of which focus on the interface between technology and the design of ecologically responsible environments. Bryan is active in several professional and technical societies; he has served on the ASHRAE committee responsible for developing the 90.1 Energy Standard, is presently serving on the ASHRAE TC 2.8 and SPC 189 committees which are concerned with Buildings Impact on the Environment, as well as the AIA's Committee on the Environment. He was on the Board of Directors of the Arizona Chapter of the U.S. Green Building Council and is certified in both BREEAM (a rating system widely used in Europe and Canada) as well as LEED. He is currently serving on the Board of Directors on the Green Building Initiative which developed the Green Globes' rating system. Bryan is a Fulbright Fellow, a Fellow of the American Institute of Architects, as well as a Fellow of the American Solar Energy Society.

2006-present, Affiliated Faculty, School of Sustainability, Arizona State University  
2003-present, Professor, School of Architecture and Landscape Architecture, Arizona State University  
1999-2003, Associate Professor, School of Architecture, Arizona State University  
1996, Visiting Professor, School of the Arts and Architecture, University of California-Los Angeles  
1986-1992, Associate Professor, Graduate School of Design, Harvard University  
1991, Visiting Professor, School of Architecture, University of Lund  
1980-1986, Assistant Professor, Department of Architecture, Massachusetts Institute of Technology

#### Synergistic Activities

1. Served on the ASHRAE committees responsible for developing the 90.1 National Energy Standard for Buildings, also served on ASHRAE TC 2.8 which is responsible for Buildings Impact on the Environment and is presently serving on ASHRAE 189.1P which is responsible for developing a National High-Performance Green Building Standard.
2. Served on the Board of Directors of the Arizona Chapter of the U.S. Green Building Council and is certified in both LEED and BREEAM (a building rating system widely used in Europe and Canada).
3. Active in the American Institute of Architects' Committee on the Environment and was chair of the Solar Buildings Division of the American Solar Energy Society and will be conference chair of *Solar 2010* which is scheduled for Phoenix in May 2010.
4. Was associate editor of the journal *Building and Environment* and is currently associate editor of the journal *Solar Energy*.

**Page 2 – Biographical Sketch – Harvey J. Bryan**

5. Widely published in the fields of energy use and building design including “Developing an operational and material CO<sub>2</sub> calculation protocol for buildings” in *Proceedings of the Sustainable Buildings 2008 (SB08) Conference*, Melbourne, Australia (2008 with W. B. Trusty); “Improving the energy and environmental performance of existing buildings” in *Proceedings of the Sustainable Building 2005 International Conference*, Tokyo, Japan (2005 with J. Skopek and W. Proulx); “Forecasting the electricity consumption of the Mexican border states maquiladoras” in *International Journal of Energy Research* (2004, with C. Flores, P. Phelan, and J-I. Mou); “Water consumption of passive and hybrid cooling strategies in hot dry climates” in *Proceedings of the 29<sup>th</sup> National Passive Solar Conference*, Portland, OR (2004); “Outdoor design criteria for the Central Phoenix/East Valley Light Rail Transit System” in *Proceedings of the Cooling Frontiers Symposium*, Arizona State University, Tempe, AZ (2001).

## **Biographical Sketch**

**Kendra Cea**

Customer Relations Area Manager

Arizona Public Service (APS)

PO Box 53933, Ste 3108, Phoenix, AZ 85072-3933

Phone: (602) 371-7872; Fax: (602) 371-6588; Kendra.Cea@aps.com

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### **Education and Training**

Northern Arizona University, Flagstaff, Honors English Major, 1986-1988

Power System Planning and Operations School, Houston, TX, 2000

Western International University, Phoenix, AZ, Behavioral Sciences, B.A., 2001

MIT/Harvard Public Disputes Program, Dealing with an Angry Public Seminar, Boston, MA, 2001

Boston College, Phoenix, AZ, Leveraging Community Partnerships, 2001

### **Professional Experience**

#### ***Customer Relations Area Manager, APS Customer Account Management, Phoenix, AZ***

Ms. Cea plans, establishes, and maintains effective and strategic relationships with the City of Phoenix (and its constituents), Maricopa County, the State of Arizona, US/Federal Government, and various "key account" customers. She achieves exceptional customer satisfaction by: promoting and ensuring exceptionally reliable service and high-quality power for these customers; ensuring that basic APS services such as billing, construction, and metering are delivered problem-free every time; understanding customers' unique business and energy-related needs; providing meaningful consulting and value-added services based on customers' needs; building lasting relationships with customers and the communities served by APS; and by acting as a passionate customer advocate every time customers do business with APS. Key project management efforts include Phoenix's downtown development including ASU Downtown, CityScape, Jackson Street Entertainment District, Maricopa County courts, Phoenix Biosciences Campus, Phoenix Convention Center, Phoenix Sheraton Starwood Hotel; Sky Harbor expansion; Capital Mall. She promotes the company's image in the community by assisting in the implementation of the community development strategic plan, working on joint issues with municipalities (and other customers), and representing APS' position on current issues. Cea also plans and "manages" APS Emergency Relief/Disaster preparedness plans, specifically for customer outreach during outages caused by summer/winter storms; heat related emergencies, etc.

Jan 2000-present, Customer Relations Area Manager, APS Customer Account Management, Phoenix, AZ

Feb 1992-Jan 2000, Corporate Programs Consultant, APS Corporate Communications, Phoenix, AZ

Feb 1990-Feb 1992, Customer Service Representative, APS Commercial Credit Department, Phoenix, AZ

Feb 1989-Feb 1990, Sales Coordinator, APS Power Quality Department, Phoenix, AZ

Aug 1987-Feb 1989, Customer Service Representative, APS Flagstaff Customer Office, Flagstaff, AZ

### **Synergistic Activities**

1. 2007-present, Member, City of Phoenix City Council Sustainability Subcommittee (re-named to Parks, Education, Biosciences and Sustainability Subcommittee 2008-2009).
2. 2006-present, Member, Phoenix Community Alliance Board and Subcommittees
3. 2005-present, Board of Directors, Maricopa Association of Governments, Continuum of Care on Homelessness.
4. 2000-present, Valley Leadership: Board of Directors, 2004-present, Executive Committee, 2006-present; Chairman-elect, 2007-2008; Fund Development Chairman, 2006-2007; Fund

**Page 2 - Biographical Sketch - Kendra Cea**

Development Committee, 2005-present; Man & Woman of the Year Awards Committee, 2007-present; Leadership Institute Chairman, 2004-2005; Leadership Institute Committee, 2003-present; Member Programs Committee and "Hot Topics" Chairman, 2001-2002; Valley Teen Leadership Committee, 2001-2002; Leadership Institute Graduate (Class 22), 2000-2001.

5. 2000-present, Phoenix Revitalization Corporation: Board of Directors, 2000-present; Chairman of the Board, 2005-2007; Interim Executive Director, Jan-May 2004; Secretary, 2004-2005; Strategic Development Committee, 2001-present, Chairman, 2003-2004; Economic Development Committee, 2001-2002; Volunteer, 1994-present.

## **Biographical Sketch**

### **Roberto E. Franco**

Assistant Director, Community and Economic Development Department  
Business Financing Division, City of Phoenix  
Phoenix City Hall, 20<sup>th</sup> Fl., 200 W. Washington St., Phoenix, AZ 85003  
Phone: (602) 495-5097; roberto.franco@phoenix.gov

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#### **Education and Training**

University of Texas-El Paso, Marketing and Accounting, B.B.A., 1979  
University of Texas-El Paso, Business, M.B.A., 2000

#### **Professional Experience**

##### ***Assistant Director, Community and Economic Development Department, Business Financing Division, City of Phoenix, AZ***

In this position, Mr. Franco has overseen the following divisions: The administration of the department's \$19 million budget, Business Attraction & Retail/Sports Development Division, Small Business Division, Downtown Development Division, Workforce Development Division, Financing and Management Services Divisions, Neighborhood Community & Retail Redevelopment Program, as well as the City's \$240 million New Markets Tax Credit commercial real estate Redevelopment loan fund. The Small Business Division programs include a \$2M economic development and management program along the 19-mile light rail path. He is also responsible for negotiation, investor relationships, fund & asset management, loan origination, investors & IRS audits, underwriting, fund operations, consultants, tax attorneys, board responsibilities, and compliance with IRS, and U.S. Treasury.

Feb 2002-present, Assistant Director, Community and Economic Development Department, Business Financing Division, City of Phoenix, AZ

Jul 2004-Jan 2007, Acting Director, Community and Economic Development Department, Business Financing Division, City of Phoenix, AZ (appointed)

May 1991-Jan 2002, Director of Economic Development, City of El Paso, TX

1988-1991, Business Manager, Brown & Root Services, Job Order Services Contract, U.S. Army, Ft. Bliss, TX

1983-1988, Director of Operations, AVANTE International Systems Corporation, El Paso, TX, Phoenix, AZ, and San Antonio, TX

#### **Synergistic Activities**

1. Phoenix Community Development & Investment Corp., President and Board member. This is a 501(C) 3 non-profit community development corporation created by the City of Phoenix in 2002 to oversee two U.S. Treasury, New Markets Tax Credit Program awards, \$170 million in 2002 and \$40 million in 2008. Successfully placed all federal tax credits with private sector investors and created three loan funds for commercial real estate development in low to moderate income areas in Phoenix. Revenues for the non-profit will exceed \$36 million by 2014, while net profits expected to exceed \$31 million after expenses. These funds will be utilized by the board to achieve its mission, to bring capital and job opportunities to low to moderate income areas of Phoenix.
2. Phoenix Workforce Connection Board Member, Strategic Taskforce
3. South Mountain Community College Advisory Board
4. National Association of Workforce Boards US Conference of Mayors
5. ASU Technopolis Advisory Board Member. ASU's Technopolis program helps transform the Phoenix area's knowledge economy. Greater Phoenix ranks at the top of the charts nationally as

**Page 2 – Biographical Sketch – Roberto E. Franco**

the best place to start a new business, as an excellent home for fast-growing companies, and as a place of highly-concentrated technology clusters, especially in the areas of microelectronics and aerospace manufacturing. ASU Technopolis leverages these strengths as well as the broad expertise and resources of the University to spur innovation in Greater Phoenix. For more information <http://www.asutechnopolis.org>.

## Biographical Sketch

Matthew P. Fraser

Associate Professor, School of Sustainability  
Co-Director for Research Development, Global Institute of Sustainability  
Arizona State University, PO Box 875402, Tempe, AZ 85287-5402  
Phone: (480) 965-3489; Fax: (480) 965-8087; Matthew.Fraser@asu.edu

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### Education and Training

Carnegie Mellon University, Chemical Engineering (with honors), B.S., 1991  
California Institute of Technology, Environmental Engineering Science, M.S., 1993  
California Institute of Technology, Environmental Engineering Science, Ph.D., 1998

### Professional Experience

**Co-Director for Research Development, Global Institute of Sustainability, Arizona State University**

**Associate Professor, School of Sustainability, Arizona State University**

As Co-Director for Research Development at Arizona State University, Professor Fraser directs several research projects on urban air quality. Fraser's research focuses on using organic speciation and receptor modeling to apportion ambient pollutants to their original source. To tackle this complex problem, his research group has been involved in field monitoring programs, source characterization studies, emission inventory preparation, and analytical method and instrument development projects.

2007-present, Associate Professor, School of Sustainability, Arizona State University (ASU)  
2007-present, Co-Director for Research Development, Global Institute of Sustainability, ASU  
2007-present, Adjunct Research Associate Professor, Civil and Environmental Engineering, Rice University  
2004-2007, Associate Professor, Civil and Environmental Engineering, Rice University  
1998-2004, Assistant Professor, Civil and Environmental Engineering, Rice University

### Synergistic Activities

1. Co-Director for Research Development, Global Institute of Sustainability at Arizona State University.
2. Co-PI of *Sustainability Science for Sustainable Schools*, a National Science Foundation GK-12 grant dealing with implementing sustainability concepts including energy auditing and efficiency into science, technology, engineering and mathematics curricula at local high schools.
3. Head of the Science Advisory Board, Engineering Research Center on Mid-Infrared Technologies for Health and the Environment, Princeton University.
4. Member of the Advisory Board of Environmental Defense Fund Texas Office.
5. Widely published in the field of energy and air pollution including "An overview of the Gulf Coast aerosol research and characterization study (The Houston Fine Particulate Matter Supersite)" in *J. Air and Waste Management Assoc.* (2006, with D. T. Allen); "Tracking petroleum refining emissions using lanthanum and lanthanides as elemental markers for PM<sub>2.5</sub>" in *Environmental Science and Technology* (2007, with S. Chellam and P. Kulkarni); "Source identification and apportionment of volatile organic compounds in Houston, TX" in *Atmos. Environ.* (2006, with B. Buzcu); "Secondary particle formation and evidence of heterogeneous chemistry during a wood smoke episode in Texas" in *Journal of Geophysical Research-Atmospheres* (2006, with B. Buzcu and others); and "Modeling heterogeneous formation of secondary organic aerosol during a wood smoke episode in Houston, TX" in *Atmospheric Environment* (2007, with D. T. Allen and others).

## Biographical Sketch

Janet S. Holston

Assistant Dean for Applied Research

Director, Herberger Institute Research Center

Herberger Institute for Design and the Arts

Arizona State University, PO Box 872105, Tempe, AZ 85287-2105

Phone: (480) 727-0478; Fax: (480) 965-9656; Janet.Holston@asu.edu

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### Education and Training

Virginia Tech, Urban Affairs, B.S., 1979

Arizona State University, M.B.A., 2008

### Professional Experience

***Assistant Dean for Applied Research and Director, Herberger Institute Research Center, Herberger Institute for Design and the Arts, Arizona State University***

As Assistant Dean for Applied Research and Director Herberger Institute Research Center, Ms. Holston is responsible for identifying and developing new research initiatives, supporting sponsored research processes in the institute, and administration of the center's general operations. She has owned a consulting company and has worked with small businesses in grants consulting, writing, editing, and project management services. A former director of the Bureau of Housing in South Bend, Indiana, she managed the federally funded housing programs for the city and has also worked for the Town of Gilbert Economic Development Department in the Community Development Block Grant program.

2009-present, Assistant Dean for Applied Research and Director, Herberger Institute Research Center, Herberger Institute for Design and the Arts, Arizona State University

2005-2009, Assistant Dean for Applied Research, Director, Herberger Center for Design Research, College of Design, ASU; Coordinator, Herberger Center for Design Research, College of Design, ASU

1998-2005, Consultant, J. L. Holston Consulting, Inc.

1994-1997, Assistant Instructor, Countryside Montessori School, South Bend, IN

1982-1986, Director, Bureau of Housing, City of South Bend, IN

1979-1981, Planner, Interim Director, Community Development Dept., City of South Bend, IN

### Synergistic Activities

1. Dept. of Energy Solar America Initiative, TPP research grant with BP Solar, project manager
2. Adapting Neighborhoods for Climate Change, British Council research grant, visiting researcher
3. Member of the American Solar Energy Society, American Association of Grant Professionals, National Council of University Research Administrators, and the ASU W. P. Carey School of Business Alumni Council.
4. CoreNet Global, Desert Mountain Chapter, Board of Directors; also served on board of directors of the National Association of Women Business Owners Phoenix Metro Chapter and the Women's Enterprise Foundation.
5. Published in the field of modeling urban design, including "Digital Phoenix Project: A multidimensional journey through time" in G. Steinebach, S. Guhathakurta, and H. Hagen, eds., *Visualizing Sustainable Planning*, Springer-Heiger, Berlin (2009, with S. Guhathakurta, Y. Kobayashi, M. Patel, T. Lant, J. Crittenden, K. Li, G.Konjevod, and K. Date).

## **Biographical Sketch**

### **Derek Horn**

Assistant Director, Operations

Development Services Department, City of Phoenix

200 W Washington St, Phoenix, AZ 85003

Phone: (602) 534-0846; Fax: (602) 534-0846; derek.horn@phoenix.gov

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### **Education and Training**

Iowa State University, Architecture, B.A.

Arizona State University, Business Administration, M.B.A.

Certified Building Official

### **Professional Experience**

#### ***Assistant Director, Operations, Development Services, City of Phoenix***

Mr. Horn serves as Assistant Director for Development Services (DSD), a department of 567 design professionals, administrators, reviewers and inspectors and an annual budget of \$60 million. The business of DSD is to enforce building codes and ordinances by reviewing building, site and civil construction plans, issuing permits and inspecting construction to ensure safe buildings for all occupants. The Operations Division is responsible for plan review and inspections for all components and phases of development and construction.

2007-Present, Assistant Director, Operations, Development Services Department, City of Phoenix  
1995-2007, Commercial Services Division, Development Services Department; staff liaison to the Development Advisory Board and its subcommittees. Mr. Horn successfully coordinated building code adoptions, developed productivity measures for plan review, developed Infill and Downtown Teams and created the department's successful Team Leader Basic Training Program.